



THE PSYCHOLOGY OF EARLY GROWTH

INCLUDING

NORMS OF INFANT BEHAVIOR AND
A METHOD OF GENETIC ANALYSIS

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PREFACE

THE Yale studies of infancy which began a score of years ago were first published by The Macmillan Company under the somewhat extensive title, *The Mental Growth of the Preschool Child. A Psychological Outline of Normal Development from Birth to the Sixth Year, Including a System of Developmental Diagnosis*. This volume, which enjoyed several reprintings, is now out of print. The present volume represents a continuation and elaboration of the earlier studies and is based upon ten years of subsequent collaborative research in the Yale Clinic of Child Development.

This research has received partial report in two further publications, namely, *An Atlas of Infant Behavior: A Systematic Delineation of the Forms and Early Growth of Human Behavior Patterns* and *Infant Behavior: Its Genesis and Growth*.¹ The present volume deals particularly with the biometric aspects of the normative investigation. These three publications are organically related to each other. It is hoped that the systematic and objective methods used will bring the study of infant development into closer alignment with biological and medical sciences. We believe that the growth processes which mold the body and the behavior of the human infant are in essence comparable with those which are being successfully analyzed by experimental embryology.

The processes of behavior growth are so subtle and intricate that they resist precise measurement. Yet they are so orderly and patterned that they constantly tempt us toward quantitative formulation. This formulation must be kept within bounds and must not yield too much to the theoretical and methodological allurements of the absolute! Our problem is genetic. We are dealing with highly complicated, developmentally flowing phenomena and our first task is to achieve an accurate expression of genetic trends and genetic configurations. We have tried to avoid any over-simplification of the biometric

¹ Gesell, A : *An Atlas of Infant Behavior: A Systematic Delineation of the Forms and Early Growth of Human Behavior Patterns*, illustrated by 3,200 action photographs in two volumes. Volume One: *Normative Series* (in collaboration with Helen Thompson and Catherine Strunk Amatruda), pp 1-524. Volume Two: *Naturalistic Series* (in collaboration with Alice V. Kelher, Frances L. Ilg, and Jessie Jervis Carlson), pp. 525-922. New Haven, Yale University Press, 1934. Pp 922. Gesell, A , and Thompson, H., assisted by Catherine S. Amatruda: *Infant Behavior: Its Genesis and Growth* New York: McGraw-Hill, 1934. Pp. viii + 343.

aspects of behavior growth and have emphasized the importance of precise specification and orderly characterization of observed behavior.

The orderly identification of numerous components in the complex of growth leads to a form of *genetic analysis*, which takes account both of total and of subsidiary patterns. Normative criteria are essential for developmental diagnosis, but they also prove indispensable for intensive sequential studies of the individual child. In the presentation of these criteria, the present volume makes some departures from prevailing statistical procedures and offers a method of analysis which if sound in principle should have application in the study of older children and of adults as well, for adult, child, and infant are subject to the same laws of growth.

The scope of the normative survey has been outlined elsewhere. A summary statement of the organization of the present volume will be found in the introductory chapter. The investigation has extended over a period of years. We are therefore under a cumulative sense of indebtedness to many co-laborers and assistants. Associated with the early stages of investigation were: Margaret Cobb Rogers, Ph.D., Elizabeth Evans Lord, Ph.D., Ruth Wendell Washburn, Ph.D., and Marian Cabot Putnam, M.D. Professor Henry M. Halverson, Research Associate in Experimental Psychology, made valuable suggestions in connection with the experimental control of the situations and their photographic recording. Helena Mallay, Helen M. Richardson, Ph.D., Charlotte Peck, Georgina Johnson, and Harriet Lange Rheingold gave painstaking assistance in the analysis of the original records. We are greatly indebted to Esther Upjohn Shipley for three years of painstaking work in the classification and treatment of the basic data.

We were particularly fortunate in the co-operation of the parents; their infants likewise favored us with a co-operation which was indeed indispensable for the research. The Visiting Nurse Association of New Haven and the Bureau of Vital Statistics of New Haven rendered invaluable aid in locating the normative infants. We regret that we cannot designate each and everyone who has rendered assistance in our many-sided task.

The researches of the Yale Clinic of Child Development have been made possible by the generous support of funds from the Laura Spelman Rockefeller Memorial, General Education Board, and Rockefeller Foundation. We shall feel well rewarded if these investigations lead, directly or indirectly, to social application.

Although the biometric study of infancy is only in its beginning, the lawful nature of the phenomena insures endless scientific progress in the understanding and control of early human growth. Where there is law there is potential prediction. Meanwhile our methods of "measurement" must be tempered to our data and must be subject to our limitations of knowledge. Numerical quantification must be duly subordinated to interpretive analysis. It is hoped that the emphasis placed upon the genetic analysis of behavior will help to prevent over-simplifications in the developmental diagnosis of infants.

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PART ONE

METHODS AND PROCEDURES

CHAPTER I

INTRODUCTION

INASMUCH as this volume combines the features of a monograph and a handbook, it will be desirable to explain in advance the general organization of the text and to indicate underlying concepts. The study here presented had its immediate inception in 1927 in an intensive survey by the research staff of the Yale Clinic of Child Development. This exploratory survey was confined to a group of five infants, three boys and two girls, who were regularly observed from birth through the first year of life. A developmental examination, a cumulative behavior inventory, and physical measurements were made every four weeks. The examination followed the basic procedures which had been formulated in an earlier volume on *The Mental Growth of the Preschool Child*.¹ The procedures there described were brought under more precise control; lunar month intervals were adopted in place of the solar month intervals previously used; the supplementary information was enriched; and an extensive cinema record was made at each examination.

The present volume has been organized as a practical manual which will replace in part the now out-of-print volume on *The Mental Growth of the Preschool Child*. Like its predecessor, the present manual deals with the normative and diagnostic aspects of the psychology of early growth.

The intensive longitudinal survey above mentioned revealed many gaps in our knowledge and demonstrated the necessity of more finely graded norms which would do justice to the finer gradations in the growth of behavior. A comparative study of the serial film records particularly impressed upon us the necessity of a more searching inquiry into the progressive differentiations and correlations of behavior forms. Out of this arose a systematic developmental investigation (1927-1931) in which the behavior and physical growth of 107 different infants were studied. All told, 524 behavior examinations were made.

¹ Gesell, Arnold: *The Mental Growth of the Preschool Child. A psychological outline of normal development from birth to the sixth year, including a system of developmental diagnosis.* New York: Macmillan, 1925. Pp. 447.

The present volume details the normative aspects of this investigation with respect to both body and behavior growth; it describes the racial, social, and economic backgrounds of the infants studied; it specifies the techniques and methods of investigation; it defines the terms used; it discusses the measurement of behavior growth; it offers graded schedules for analyzing and appraising an infant's developmental status; it suggests procedures for various forms of clinical service; and it indicates the precautions which must be observed in the clinical diagnosis of behavior status.

With similar brevity the underlying concepts of the normative study may be summed up as follows: Behavior grows. Growth expresses itself in ordered patterns. Behavior growth, like physical growth, is a morphosis. It is a process which produces a progressive organization of behavior *forms*. This morphogenesis can be investigated by morphographic methods and especially by analytic cinematography. By these methods we can ascertain the lawful sequences and norms of psychological growth for the purpose of genetic research. These norms may also be used as standards of reference for the analytic appraisal of developmental status. Such appraisal is a clinical task.

What is a norm? It is a rule or an authoritative standard of reference. For some the word *norm* has acquired an unfortunate connotation because it suggests a leveling or compressive kind of standard incompatible with the richness of variation which distinguishes human nature. This connotation, however, probably arises out of the misuses to which norms have been put both in theoretical discussion and in psychometric application. Our own concept of normative methods is colored by a keen appreciation of the abounding variety of individual differences. Indeed, the very richness of this variety creates a necessity for normative specifications. We need norms to detect and to identify the numerous behavior characters. Without norms we could neither capture nor formulate the rich diversity of phenomena which Nature provides in every cycle of infant development.

This development is so fluent and complex that it cannot be measured by any available absolute quantum or unit. Surely we are still very remote from the mathematical precisions of the physical sciences. It would, however, be a form of defeatism to withdraw from the bewildering complexities of infant growth simply because every individual is unique and intricate. We need devices of observation and of specification which will identify the components, the trends, and the very individuality of the patterns of growth.

Accordingly we set up norms as standards of reference against which observed phenomena can be projected. There is an element of comparison in all measurement. The perfect measure is a perfect comparison with a calibrated scale. Lacking a calibration of absolute units, we adopt instead a hierarchy of normative specifications. This hierarchy permits increasingly refined comparison. From this standpoint we regard the norm as a scientific device which, although it may not yield an absolute measurement, may still be used as an instrumental aid for the quantitative analysis of complicated processes of behavior growth. We do not set up the norm as a final standard of excellence but as a formal datum derived by controlled investigation. As such it becomes a device for the classification and correlation of data.

We must either compare the individual with himself — he then becomes his own norm — or he may be compared with some more generic standard. If the standard is at all generic, it must have been derived by a cross-sectional study of a group of individuals.

The character of the generic norm of course depends upon the extent and nature of the population studied. The norm may be derived from a random sample or from a homogeneous group. The present normative investigation was based upon a delimited sector of the population. The norms represent central tendencies for this homogeneous group. In the investigation we combined both the cross-sectional and the sequential methods of study. Some of the subjects were regularly and repeatedly examined, while others were seen only once.

There was no occasion for making a drastic distinction between so-called longitudinal and cross-sectional methods of study. Each method excludes the other if pushed to extremes. Both methods can be combined if kept in proper balance. Indeed, this reciprocal relationship between the cross-sectional and the sequential approach is so fundamental for the study of growth that conceptually we may say neither method attains its optimum results apart from the other.

The chapters of the present volume readily group into three divisions. Part One deals with the methods and procedures of the normative survey. In Chapter II the scope of the study and the general arrangements for the examination are outlined. Chapter III deals with the characteristics of the normative infants selected to give a relatively homogeneous population group.

Nationality, occupation status, education of the parents, and birth history of the subjects are tabulated and discussed. Chapter IV describes in detail the examination equipment, examination materials, the order of the examination, and the specific procedures used in securing the basic observations. These procedures are formulated in the active voice to make the directions more serviceable for the student. The various behavior records and their reliability are considered in Chapter V. Chapter VI describes the general and specific procedures used in securing the physical measurements.

Part Two assembles both the physical and the behavior norms. In Chapter VII the behavior items for each of the 26 behavior situations and the tables of percentage frequencies of the various age levels are supplied. Each table lists the various behavior items, usually about 50 in number, which were identified in the reactions of the child to the situation. The behavior situations are arranged alphabetically to facilitate reference.

Chapter VIII supplies a normative summary for each age level. Each summary is in the nature of a thumbnail sketch which outlines the salient characteristics of behavior. These descriptive summaries, as well as the percentage tables, will be of assistance in the application of the norms. The anthropometric norms and the derived indices are tabulated in Chapter X.

Chapter IX consists of a set of tables which assemble diversified behavior items with special reference to their genetic and functional continuities. This schedule may therefore be regarded as a recodification of the normative items and is designed to be of service in the analysis of special cases which present marked deviations of development. The behavior items are classified under such functional categories as arm-hand posture, focus of regard, prehension, approach, etc.

Part Three discusses in detail the application of these norms to the analytic appraisal of behavior for the purposes of genetic research or clinical diagnosis. The underlying principles and limitations of genetic analysis are indicated. Chapter XII describes an *Analytic Developmental Schedule* and gives detailed directions for its application.

Chapter XIII outlines the record forms and procedures which are used for developmental diagnosis. These forms may be used in various combinations, depending upon the objectives. Throughout the volume an effort has been made to present the material in such a way that it may be serviceable for varying requirements of research and diagnosis.

Although the present volume may be used independently, its relationship to preceding volumes should be briefly noted.

*An Atlas of Infant Behavior*² in two volumes presents a systematic delineation of behavior-pattern phases by means of 3,200 action photographs. A large number of these photographs are illustrative of the normative behavior items listed in Chapter VII. Those who desire a still more dynamic delineation of the behavior patterns may be referred to the edited motion picture films listed in Appendix B. These films correspond to the behavior situations codified in the *Atlas*. The films preserve the organic unity and fluency of the original behavior. Repeated systematic inspection of a series of films serves to sensitize the student to the behavior characteristics which he may observe in the living infant.

An earlier publication, entitled *Infancy and Human Growth*,³ considers concretely the behavior growth complexes of a wide diversity of infants who presented various forms of normal, retarded, atypical, and pseudo-atypical development. The volume entitled *Infant Behavior: Its Genesis and Growth*⁴ is a companion volume to the present work. It reports the findings of the normative survey and provides genetic interpretations of the behavior displayed in each examination situation. The integral and sequential aspects of behavior growth are emphasized. It is hoped that this emphasis will correct any tendency toward an uncritical application of the analytic norms.

² Gesell, Arnold et al.: *An Atlas of Infant Behavior*.

³ Gesell, Arnold: *Infancy and Human Growth*. New York: Macmillan, 1928. Pp. 418.

⁴ Gesell, A., Thompson, H., assisted by Catherine S. Amatruda: *Infant Behavior*.

CHAPTER II

THE NORMATIVE INVESTIGATION

THE systematic normative survey of the first year of life was preceded by an intensive study of the behavior growth of five infants. The preliminary study served to define the most promising lines for observation. To insure the consideration of the varied factors which influence infant behavior, it was decided to include the following data in the systematic survey:

- (1) A stenographic record of behavior responses in specified controlled situations designed to elicit motor, visual, auditory, adaptive, vocal, and social responses.
- (2) Supplementary reported information concerning the infant's behavior at home.
- (3) An interview to secure a behavior day record of the child's sleeping and waking hours, feeding time, play activities, and other daily behavior.
- (4) Physical measurements of gross skeletal dimensions, weight, and other items such as dentition.
- (5) A history of the birth, early development, and health.

To obtain the complete record required on the average about two hours. The infants were ordinarily brought to the Clinic in the afternoon at the time of their longest waking period; about 16 infants were studied each month. A minimum of 24 infants (12 boys and 12 girls) were finally investigated at each of 15 age levels, namely 4, 6, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, and 56 weeks.

The investigation began with the 16 weeks age level. This age period has significant transitional characteristics because important phases of posture and of prehension are then in a formative stage. When the data for the 16 weeks and subsequent age levels were more than half complete, the earlier age levels, 4, 6, 8, and 12 weeks, were studied. These younger cases were also examined at 16 weeks, furnishing two sets of data for that age. This arrangement facilitated both backward and forward reference and incidentally offered a useful test of the consistency of our data.

The lunar month has fairly obvious scientific advantages over the solar month interval. Lunar month periods are equal; they can be readily subdivided into the four-week units upon which our economic life and the household routines of everyday living are based; they are highly correlated with the female sex cycle and hence with prenatal life and the gestation period; and finally they can be grouped to correspond with solar seasonal changes which have a regulatory influence on growth.

The study was not carried below the four-week age period for both practical and scientific reasons. The rapidity and character of behavior growth in the neonate demand the utilization of very special techniques. After the period of hospitalization, the mother must adjust to new demands at a time when her endurance is below normal. To tax her further at this time was considered inadvisable. After four weeks, however, the mother and the infant are fairly stabilized in their new environment.

Homogeneity of Subjects. Inasmuch as the number of infants to be investigated was restricted, it became important to narrow the range of variation in the subjects. By carefully selecting a homogeneous group rather than a random sample of the population, the normative character of the data was greatly strengthened and the central trends of development were accentuated. A relative homogeneity of environment, racial inheritance, and physical status was secured by including only those infants whose parents were of the middle socio-economic status with respect to occupation, schooling, avocational interests, and home equipment; whose parents were born in this country; whose grandparents were of northern European extraction; and whose gestation term, birth history, and physical status were within specified limits. To insure homogeneity of age, a variation of but two days from the exact age for each examination was the rule.

Initial Contacts. Contact with the cases was made through the Visiting Nurse Association and the Bureau of Vital Statistics. The head of the Child Welfare Department of the Visiting Nurse Association directed her workers to send us the names of infants who would fulfill our requirements. We inspected and checked this list. The Visiting Nurse made the first contact with the parents, telling them of our project and asking if a visitor might call. When such permission was secured, our home visitor went into the home, secured further necessary information concerning the home and parents and, if this information again checked with our standards, an appointment was made for

the Clinic examination. The parents were never urged to co-operate with us. Their confidence was gained by emphasizing the fact that we were selecting only normal, healthy infants for study. The parents were obviously motivated by a genuine interest in observing the development of their children.

When the Visiting Nurse Association had no cases to suggest to us, we resorted to the birth lists, made available through the co-operation of the Bureau of Vital Statistics. These lists included all infants born in New Haven and indicated the number of children in the family, the occupation of the father, the home address, and the attending physician. From this roster it was possible to select those cases which seemed likely to fit our requirements. Our worker then proceeded as with the cases referred by the Visiting Nurse. The following table indicates the number of subjects secured by each method:

TABLE 1
SOURCE OF CASES STUDIED

AGENCIES	NUMBER OF CASES			NUMBER OF EXAMINATIONS		
	Boys	Girls	Total	Boys	Girls	Total
Visiting Nurse Association	25	33	58	100	111	211
Bureau of Vital Statistics	24	25	49	156	157	313

The Examination Panel. Sequential observations were bound to prove valuable for genetic study. Some children were therefore systematically examined at four-week intervals. In order to determine any possible tendency for the behavior to be influenced by repeated experience with the examination materials, other children were examined at longer intervals or only once. The following table shows the time elapsing between successive examinations.

TABLE 2
NUMBER OF CASES EXAMINED AT EACH AGE
Classified According to the Number of Weeks Since the Previous Examination

INTERVAL	EXAMINATION AGE LEVEL — WEEKS														
	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
2 weeks . . . . .	..	29	28												
4 weeks . . . . .	.	..	..	26	26	20	26	26	20	23	29	28	31	31	15
8 weeks . . . . .	..	..	..	.	..	1	3	1	4	1	3	4	2	1	1
12 weeks . . . . .	.	..	..	.	..	..	..	..	1	2	3	1	2	1	2
16 weeks . . . . .	.	..	..	.	..	..	..	..	1	2	1	1	1	1	1
20 weeks or over . . . . .	.	..	..	..	..	..	..	..	1	2	1	1	2	12	12
Initial examination	32	0	0	0	23	18	10	4	11	4	1	0	0	0	0
Total	32	29	28	26	49	38	37	33	33	35	37	33	38	48	28

TABLE 3
SUMMARY TABLE OF EXAMINATIONS
Detailing (a) Age and Sex of Child, (b) Place of Examination, and (c) Cinema Record

Age (weeks)	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
Number of boys . .	16	14	14	13	26	17	16	15	15	17	20	17	19	22	15
Number of girls . .	16	15	14	13	23	21	21	18	18	18	17	16	19	26	13
Total	32	29	28	26	49	38	37	33	33	35	37	33	38	48	28
Home examination . .	30	24	2	26	26	49	38	37	33	33	35	37	33	39	28
Clinic examination . .	2	5	26	14	17	18	17	17	17	19	16	14	20	26	4
Partial cinema . .	3	4	25	26	25	8	9	8	10	11	10	11	12	11	7
Full cinema . .															

Table 3 summarizes by ages the number of boys and girls examined, the locus of the examination (home or clinic), and the number of cinema records (partial and complete). One examiner made all of the observations below the 16 weeks level and re-examined her cases at 16 weeks of age. These re-examinations omitted some situations included in the regular schedule for 16 weeks, but they were so planned as to co-ordinate the examination procedure for the younger age group with that for the older age group. This made available two sets of data for the 16 weeks age level and thereby afforded an excellent check on the reliability of the study.

Photographic Records. All of the examination behavior responses of the infants examined at the Clinic prior to the age of 16 weeks were recorded on 16 mm. cinema film. Full or partial cinema records were obtained for the majority of the remaining examinations. Seven children were filmed in detail at each of the fifteen developmental examinations. Full cinema records are available for 34 per cent of the 524 examinations. For 82 cases, or 77 per cent of the 107 different infants studied, at least a partial cinema record was made. In addition to the cinema record, an identifying photograph of the child was taken for 99 of the 107 cases.

The Home Examinations. Most of the examinations of the 4 and 6 weeks old infants were conducted in the home. An attempt was made to keep the home conditions uniform and similar to those at the Clinic. The examiner took into the home a portable, canvas-topped dressing table, which is more fully described elsewhere (Chapter IV, §1). The examiner was accompanied by a trained secretary to whom a description of the infant's behavior was dictated. The dictation served to make the examination formal and it also had

the desirable effect of inhibiting interfering conversation on the part of the family. Physical measurements were not made on infants examined in the home. All but two of the examinations of subjects older than 6 weeks were made at the Clinic.

The Observations at the Clinic. The general arrangements for the visit to the Clinic were planned to secure a maximum of data. The entire visit from arrival to departure was recorded on a special clinic day record form. Each episode was entered and notes were made of any complications, emotional or physical, which might affect the child's responses.

The accompanying table (Table 4) summarizes the duration of the visit, the duration of the examination, and items relating to the child's adjustment to the Clinic. For a concrete visualization of the Clinic visits, the reader may be referred to a series of talking films¹ which picture the arrangements and examination procedures.

The examination was planned for that time when the infant was most responsive. For the 4 and 6 weeks old infants this was usually in the morning; from 8 through 44 weeks, it was usually in the early afternoon. Infants 8 weeks of age and older usually have a bottle at about 2 o'clock, after which they are awake and reactive. Occasionally the mother and child arrived at the Clinic just before this feeding time. In these instances the child was fed at the Clinic and the examination conducted soon thereafter. In other instances, the feeding was given at home and the mother and child were then brought to the Clinic. The mother had been instructed to bring with her either supplementary feeding or water. If the child had a particular toy which would aid in his adjustment, that also was brought along. Transportation to and from the Clinic was provided. The informal contacts in the home and on the trip to the Clinic yielded much valuable incidental information concerning home conditions, discipline, and parent-child relationships.

At the Clinic, the mother and child were met by the examiner who made no immediate approach to the infant, but remained present and talked with the mother while the child's outer wraps were being removed. This leisurely arrangement facilitated adjustment on the part of both mother and child.

¹ THE YALE FILMS OF CHILD DEVELOPMENT: (1) The Study of Infant Behavior. A talking film in 2 reels, 35 mm., 2,000 ft.; also 16 mm. New York: Erpi Picture Consultants, Inc., 1930. (2) The Growth of Infant Behavior: Early Stages. A talking film in 1 reel, 35 mm., 1,000 ft.; also 16 mm. (3) The Growth of Infant Behavior: Later Stages. A talking film in 1 reel, 35 mm., 1,000 ft., also 16 mm. (4) Behavior Patterns at One Year. A talking film, 1 reel, 35 mm., 1,000 ft., also 16 mm. New York: Erpi Picture Consultants, Inc., 1934.

For a complete bibliography of edited films, see Appendix B.

TABLE 4
The Clinic Day
Detailing the Time, Duration, Adjustments, and Events of the Clinic Visits

Age	Wks.	Caret. IN A.M. Dinner IN P.M. Supper IN P.M.	Duration of Visit	Examination	Examined in 1 2 3 or more per period		Adjustment		Fretted During		Fretting Through- out		Exam		Measurements Taken		Visit Included		
					%	%	%	%	%	%	%	%	Beg	Mid	End	Meas	None	At Beg E.	At Mid E.
					No.	Hr.. Min.	Mn.	%	%	%	%	%	%	%	%	No	%	%	%
4	32	97	3	..	15	84+	15+	0	0	97	28	3	25	31	40	0	32	0	0
6	29	86	14	..	16	96+	3+	0	0	100	41	0	24	17	6	26	0	0	10
8	28	11	89	1:18	17	92+	7+	0	0	93	17	7	32	14	28	1	0	3	47
12	26	8	92	1:16	23	88+	11+	0	0	100	31	0	26	23	34	0	0	100	31
16	49	6	94	2:3	37	48	33	18	10	92	24	8	14	49	47	18	1	6	12
20	38	5	95	2:12	42	50	41	9	0	95	24	5	8	44	29	1	3	18	24
24	37	11	89	1:59	41	44+	38+	21	3	95	38	5	8	46	41	30	0	19	81
28	33	9	91	1:53	46	39+	52+	9	0	97	27	3	30	48	27	15	0	0	32
32	33	18	82	1:56	43	58	33	12	0	94	36	6	33	48	30	21	0	0	33
36	35	11	89	1:57	43	50	32	17	0	97	40	3	26	29	9	46	1	0	15
40	37	14	86	1:53	48	65	53	3	90	35	10	22	5	38	1	0	14	33	
44	33	12	88	2:3	48	62	35	6	97	30	3	30	39	18	42	0	0	15	
48	38	24	76	1:49	46	72	20	9	5	95	34	5	21	37	34	24	0	0	26
52	48	33	67	1:56	47	67	28	4	2	94	29	6	25	27	21	4	0	0	3
56	28	21	79	1:29	41	54	36	3	0	96	39	4	25	29	11	18	3	0	0

* At beginning of examination.

The Behavior Examination. As related earlier, the examination time was adjusted to the infant's most reactive period. It sometimes took as much as half an hour, especially at the older age levels, for the child to become sufficiently familiar with the examiner to permit the examination to begin. If there was no indication that the child was sleepy, hungry, or disturbed by the strange surroundings, he was immediately undressed, wrapped in a blanket, and taken into the photographic dome; or, when no cinema record was made, into the examining room. The examiner preceded the mother into the room and indicated where the infant should be placed. Whenever possible, the mother was asked to retire behind the one-way-vision screen with which both dome and examining room were equipped. A specially trained stenographer was stationed behind the one-way-vision screen in readiness to make notes and to take dictation.

As soon as the examiner entered he began dictating the child's initial responses and adjustments to the new surroundings. The dictation was continued throughout the examination in a low conversational tone. This circumstance tended to make the situation natural and reassuring to the infant. With an initial sense of security established, the examiner was able to secure typical behavior responses. While presenting the test material, the examiner was careful not to obtrude into the child's behavior. If the child cried during the examination, the examination was discontinued until he was calm again.

An effort was made to keep the mother and child free from any disturbances. Camera noises had been reduced to a minimum by sound-proof boxes for the cameras. The general novelty and interest of the situation were usually sufficient to prevent any interference on the part of the mother. An effort was also made to preserve continuity in the whole examination. The transitions from one behavior situation to the next were made as smoothly as possible, and the child's reactions during the transition were incorporated into the continuous dictated report of his behavior.

At the end of the examination the infant was wrapped in a blanket and carried by the examiner or mother to the room for weighing and measuring.

The Physical Measurements. As a rule the physical measurements were determined at the end of the examination, but occasionally they were made during an intervening rest period. The brief restraint necessary for the linear measurements frequently caused the child to protest by crying. Since this might have had an adverse effect on his subsequent behavior, measurements

were usually deferred. To secure the physical measurements, the mother and child were taken to an adjoining room. The child was placed on the measuring board according to the examiner's direction. The mother was then instructed by demonstration how to assist in holding the child's legs. When all was in readiness the measurements were made and the readings were dictated to the stenographer, who sometimes lent assistance by entertaining the child with a toy to distract his attention from the necessary manipulation.

Again every attempt was made to preserve a businesslike and calm attitude. The mother's questions were not encouraged until later. The measurements were completed with as much dispatch as possible to avoid restlessness on the part of the child.

The Interview. When the anthropometric data had been obtained and the child was dressed, the examiner questioned the mother for details of the infant's routine day and home behavior, entering the information on a record form. During the interview the infant was usually placed in a crib or pen where he could rest or play. Not infrequently he was given his bottle and was sound asleep when the interview was finished and the Clinic visit concluded.

The Report. On her departure, the mother was given a simple typewritten report of the child's height, weight, and behavior noted during the examination. If a still picture had been taken on a former visit, a print of this picture was also presented to her.

The Examiner's Summary. After the mother and infant departed, the examiner rated the infant's behavior on the Yale Infant Development Schedule.² By this means, estimates of the status of development in motor, language, adaptive, and social behavior were deduced. A summary paragraph describing the examiner's general impression of the individualistic features of the infant's behavior was entered into the record. Frequently a prediction was hazarded. The ratings were made not for the purpose of later analysis but to assist the examiner in repeatedly focalizing and sharpening observations. These recorded clinical impressions should prove of some value in later biogenetic studies.

The Follow-up Program. In accordance with the normative research program, follow-up examinations have been and are still being made. Seventy-six, or 71 per cent of the cases, were re-examined at the age of either 5 or 6 years.

² Gesell, Arnold: *Infancy and Human Growth*. (See Chapter VI, "An infant development recording schedule: A graded schedule for the normative study of infant behavior," pp. 126-135.)

One additional case not available at these ages returned to New Haven and was examined at 8 years. Four other children were not examined, but will probably be seen at the age of 10 years. Twenty-six children are no longer available for re-examination: 2 died; 5 could not be located; 10 moved out of town; 2 are ill, one with rheumatic fever, and one is crippled from infantile paralysis; 7 were unable to co-operate for various reasons, such as illness in the family or other complicating home conditions.

Re-examination of all the available cases at the 10 year level is in progress. It should be mentioned that the re-examinations have been made both by persons who have had no previous experience with the child and by those who made the first observations. The underlying objective in these re-examinations is to trace the behavior patterns of infancy to the corresponding patterns of later childhood, and to find the genesis of the more mature behavior in the less mature responses of the infant. It is hoped that such data will have value for genetic analysis and will cast some light on the nature and predictability of individual growth.

CHAPTER III

THE NORMATIVE INFANTS

THE advantages of a homogeneous selection of subjects have already been suggested. For this particular study it was not necessary to ascertain behavior variations of a diversified population. Our problem was *not* the construction of a scale for the evaluation of a child's behavior in terms of *all* infants of his age. We desired instead to investigate the patterning of growth; to plot systematically the course of development of a statistically average individual; to establish the differences between such a normative infant at any one age level and at the age level four weeks earlier and four weeks later; and thus to construct a standard scale of growth gradations by which it would be possible to determine the developmental status of any infant *in terms of graduated specifications*. The procedures were further affected by a desire to study as fundamentally as possible the characteristics of the behavior growth process itself, so that any measuring or analytic device which might evolve would be adapted to the actual nature of this growth process.

A homogeneous sampling enabled us to ascertain central tendencies with a degree of accuracy attainable only by twice as many cases of a heterogeneous sampling of the population. The overlapping of adjacent age levels is considerably lessened with a homogeneous group, and age differences are made more apparent.

The Selection of the Subjects. The subjects were selected on the basis of presumptive normality. To have selected the infants on the basis of adjudged normality would not have been scientifically warrantable. A premium was placed on potential normality by selecting children of a highly homogeneous group of normal parents and by excluding any infant whose history since conception contained any obviously abnormal or distorting factors of significance. In other words, we assumed that the offspring of the middle 50 per cent of the population would be correspondingly average. Undoubtedly greater dispersion is to be expected in the offspring. There is probably a general tendency for the average to change.

The parent of middle socio-economic status is often very conservative and cautious. It entailed some extra effort to establish the co-operation of parents whose outlook had not made them sensitive to the values of research. However, with this impediment overcome, the homes selected proved ideal for our investigation.

The method of selection has undoubtedly yielded a group of "normal" subjects. Many of them have been re-examined at ages up through 5 years; some, at 10 years. To date there is no evidence that a defective or even a highly atypical child has been included in our series. Further proof of the normality of the group awaits the completion of the re-examinations.

Socio-economic Status of Parents and Grandparents. In Chapter II the agencies and methods employed in selecting the group to be studied were discussed. The father's occupation was the first item to be scrutinized. Only occupations falling within the 4.98 and 11.74 score range value, as listed on the Barr Scale¹ of occupational intelligence, were considered. The list of paternal occupations of the group is given in Table 5. The average and sigma values for parental Barr Scale ratings are given in Table 6 for each age group, for the

TABLE 5
OCCUPATIONS OF FATHERS

	NO. CASES		NO. CASES		NO. CASES
Adjuster	1	Fireman — City	4	Photoengraver	2
Bricklayer	1	Fireman — R. R.	4	Pipefitter	1
Butcher	1	Foreman	4	Plumber's helper	1
Carpenter	3	Garage worker	1	Policeman (incl. patrolman)	7
Chauffeur	1	Gas station attendant	2	Postman	1
Checker	1	Inspector	2	Printer	2
Chef	1	Janitor	1	† Sales agent	12
Chemist	1	† Laborer	1	Signal man (asst.)	2
* Clerk	6	Linotype operator	2	Storekeeper	3
Conductor — R. R.	1	Machine tender	1	Telephone Company em- ployee	1
Contractor	1	Machinist	4		
Delivery man	1	Manager (chain store)	1	Telephone linesman	1
Die-cutter	1	Mechanic	2	Ticket seller	2
Driver	3	Motorman (trolley)	1	Timekeeper	1
Electrician	3	Molder	1	Watchman	1
Engineer	4	Odd jobs	1	Wire insulator	1
Factory operator (machine and handwork)	3	Painter	3	Wire worker	1
				Total	107

* Includes shipping clerk, clerk in traffic department of R. R., and stock clerk.

† Beginning to go out with own gang.

‡ Includes sales agents of: autos, bakery goods, books, ice cream, insurance, milk, novelties, and pianos.

¹ Terman, L. M.: *Genetic Studies of Genius* Stanford University, Calif., Stanford University Press, 1925. Pp. xiii + 648. (See pp. 66-72.)

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TABLE 6
OCCUPATIONAL STATUS
Detailing the Average Barr Scale Ratings, Individual and Composite, with Standard Deviations by Age and Sex

AGE	FATHER'S RATING (BARR SCALE)				Composite Rating *			
	GIRLS		BOYS		BOYS AND GIRLS		BOYS	
	Number	Average	σ	Number	Average	σ	Number	Average
4	16	8.52	1.74	16	8.07	1.57	32	8.23
6	15	8.47	1.79	14	8.17	1.55	29	8.32
8	14	8.32	1.71	14	8.17	1.55	28	8.24
10	13	8.17	1.68	13	8.05	1.55	26	8.11
12	23	8.51	1.77	26	9.44	1.51	49	9.00
14	21	9.47	1.58	17	8.49	1.93	38	9.03
16	21	9.38	1.67	16	8.77	1.84	37	9.12
18	18	9.38	1.66	15	8.06	2.77	33	9.08
20	18	9.47	1.71	15	8.33	2.01	33	8.95
22	18	9.21	1.86	17	8.52	2.28	35	8.87
24	17	8.94	1.72	20	8.41	2.42	37	8.65
26	16	9.41	1.64	17	8.29	2.56	33	8.83
28	19	9.54	1.54	19	8.64	2.24	38	9.09
30	26	9.39	1.83	22	8.68	1.87	48	9.06
32	13	9.53	1.66	15	8.38	1.91	28	8.91
Total Exams	268	9.08	1.77	256	8.53	2.05	524	8.31
Total Cases	58	9.08	1.76	49	8.31	1.98	107	8.73

Cf Adult Males of General Population 1910 Census — San Francisco
 Los Angeles } San Francisco
 Oakland } Los Angeles
 Method A } Method B

Average σ
 8.88 3.24
 7.92 3.38

* Parents and grandparents
 σ = standard deviation

total examinations, and for the total cases. It is seen that for the boy and girl infants, the average rating both for the total number of examinations and of cases is close to that of the adult male population of the three California cities, San Francisco, Los Angeles, and Oakland, which are given for comparison. Table 7 lists the grouping of fathers' occupations on the basis of the Minneapolis population and the Goodenough categories.

The fathers' average Barr Scale rating (9.08) for the total number of girls corresponds to the occupation of an electric repair man; that is, one who repairs utensils, devices and machines; that of the boys (8.53) represents a forest ranger or a stone mason. The difference between the averages of the two groups, the male and the female infants, is a statistically reliable one, as it is five times the probable error of the difference. However, a recent article² points out that a more indicative measure of the disparity between two groups is their degree of overlapping. The Barr Scale rating of 43 per cent of the boys' fathers reaches or exceeds the median rating of the girls' fathers. The difference between the averages for the various age groups may also be compared. The highest average, 9.54, is represented by a tailor employed in a tailoring shop; while 8.05, the lowest, is the equivalent of a plasterer required to have a knowledge of the materials which he uses. From a practical standpoint both represent an average occupation. A more significant fact from the point of view of the homogeneity of our subjects is the comparison of the range and standard deviation of our group with that of the general population of the three California cities. The range in this study is limited to plus and minus one standard deviation of the average for the California cities. In other words, our cases were chosen as representative of the middle 66½ per cent of the California cities' population. Our group is thus highly homogeneous with respect to occupational status.

We were interested not only in the fathers' occupations, but also in that of the mothers and that of the grandparents. Comparisons with the general population in this respect are not possible. Woman's level in relation to occupational status is not as consistent as that of man's and the occupations of a generation ago, as designated by the infants' grandparents, denoted a different socio-economic level from that of those same occupations today. Nevertheless we made a composite Barr Scale socio-economic rating for the parents and

² Lincoln, Edward A.: "The Insignificance of Significant Differences." *Journal of Experimental Education*, 1934, 2, 288-290.

grandparents of each child. If the mother had never had any occupation other than that of housewife, she was assigned the rating given her husband. The ratings of parent and grandparent were weighted, each parent $\frac{1}{4}$, each grandparent $\frac{1}{8}$, and the average was then determined. The results are of no absolute value, but between the age groups the statistics may have some relative significance. The figures in Table 6 are presented with a full appreciation of their limitations.

TABLE 7
OCCUPATION OF FATHERS
Classified according to Goodenough's Occupational Categories

CATEGORIES	NO. CASES	PER CENT OF TOTAL	PER CENT OF MALE POPULATION IN MINNEAPOLIS 1920, BETWEEN THE AGES 21 AND 45
Group I (highest) . . .	0	0 0	5 4
Group II	0	0 0	6.3
Group III	48	44 9} 90 7	37.3} 61.6
Group IV	49	45 8	24.3
Group V	10	9 3	14.9
Group VI	0	0 0	11 8
Total . . .	107	100 0	100 0

When the fathers' occupations are classified according to Goodenough's³ occupational categories, it is seen (Table 7) that 91 per cent fall in the middle categories III and IV, as opposed to 62 per cent of the Minneapolis male population of the same ages, and that 100 per cent as opposed to 77 per cent are included in categories III, IV, and V.

Schooling of Parents and Grandparents. The average years of the schooling of the parents and grandparents is given in Table 8. None had liberal-arts college training, though some had business, trade, or agricultural school education beyond that given in high school.

³ Goodenough, F. L. *The Kuhlman Binet Tests for Children of the Preschool Age*. Minneapolis. The University of Minnesota Press, 1928. Pp. 146. (See pp. 133-136.)

TABLE 8
YEARS OF SCHOOLING OF PARENTS AND GRANDPARENTS
(107 cases 49 boys, 58 girls)

	AVERAGE			STANDARD DEVIATION		
	Boys	Girls	Boys and Girls	Boys	Girls	Boys and Girls
Father . . .	9.1	9.5	9.4	1.8	2.2	2.0
Mother . . .	9.8	9.7	9.8	2.1	2.3	2.2
Both . . .	9.5	9.6	9.6	1.5	2.1	1.9
Maternal grandfather	7.7	7.4	7.5	1.9	1.6	1.8
Maternal grandmother	7.3	7.9	7.6	1.0	2.0	1.8
Both . . .	7.5	7.6	7.6	1.2	1.6	1.5
Paternal grandfather	7.3	7.4	7.4	1.2	1.6	1.4
Paternal grandmother	7.2	7.4	7.3	1.2	1.6	1.4
Both	7.3	7.4	7.3	1.0	1.5	1.3

To illustrate further the narrow range of life station included in the group, the complete home record on three cases is given in full. The first two cases represent what we have judged to be the highest and lowest socio-economic level found in the group, while the third is typical of the average.

HIGHEST SOCIO-ECONOMIC RECORD

Date: 3-6-30

Recorded by: CSA

Address:

Contacted through. Bureau of Vital Statistics

HOME RECORD

Name: G 43

Born February 5, 1—

Phone No.

	NAME	AGE	NATIONALITY	OCCUPATION	EDUCATION — REMARKS
Father . . .	G.	23 yrs.	American	Ice-cream salesman	H. S. graduate
Mother . . .	M.	20 yrs.	American	Housewife	H. S. graduate
M. G. F. . .	G.	dead	German	Baker	Equivalent to Grammar school
M. G. M. . .	M.	50 yrs.	German	Housewife	Equivalent to Grammar school
P. G. F. . .	F.	?	American (Eng. des.)	Foreman at clock shop	Grammar school
P. G. M. .	M.	?	Scotch	Housewife	Grammar school
Brothers or sisters .	G.	2½			

House or apartment: rent* or own

Rooms: 5

Servants: sends laundry out

No. of people: 6 (four grown, two children)

Books, few fiction

Magazines: Cosmo, Detective; Wild Western

Newspaper: New Haven Register

Summer vacation no

Family physician: Dr. — for baby

General characterization (see memo for details): Home neat, fairly prosperous, well managed. Mrs — rather a social person; entertains and goes out a great deal.

Piano: no

Victrola: no

Radio: yes

Clubs: no

Church: Presbyterian

Concerts: no

Lectures: no

Automobile: DeSoto

Sports: no

Theater: twice a week to movies; sometimes oftener

* Italics indicate items which were underlined on the record forms.

LOWEST SOCIO-ECONOMIC RECORD

HOME RECORD

Date: 9-30-29
 Recorded by: GEB
 Address:

Name: B 22
 Born: February 2, 1—

Contacted through Visiting Nurse Association

	NAME	AGE	NATIONALITY	OCCUPATION	EDUCATION — REMARKS
Father	J.	21 yrs.	American	Plumber's helper	2 yrs H. S.
Mother	V.	22 yrs.	American	Housewife	Grammar—ward helper before married
M. G. F.	C	dead	American (Irish)	Boss gang for city	Grad. from grammar school
M. G. M.	L.	40 yrs	American (Irish)	Factory worker	
P. G. F	J	dead	German	Drop forger	Probably educated in Germany
P. G. M	?	dead	German		Probably educated in Germany
Brothers or sisters					

House or apartment: rent or own
 Rooms: 3 (third floor)

Piano: no

Concerts: no

Servants: does all own work

Victrola: no

Lectures: no

No. people: 3

Radio: yes

Automobiles: no
 Sports: plays basket-,
 et-, foot-, and
 baseball

Books: no

Clubs: Y.M.C.A.

Magazines: True Story, True Romance

Theater:
 Used to go every
 pay day (twice a
 month) before
 baby

Husband: Wild Western; Detective

Newspapers:

Summer vacation: no

Church: Church of the
 Redeemer Mother has
 changed to Protos. and
 joined church,

Family physician: Dr. — hospital dispensary.

Dr. — delivered baby

General characterization (see memo for details). A very small third floor rent in a very poor neighborhood. Home is not kept very clean, although Mrs. — is as clean and neat as possible. She complains constantly, doesn't seem to have any friends, and evidently quarrels with her husband. He stays out late at night playing cards. Seems very young and lacks common sense. However, baby is well cared for.

AVERAGE SOCIO-ECONOMIC RECORD

HOME RECORD

Date: 10-22-29
 Recorded by. GEB
 Address.

Name: B 27
 Born. July 16, 1—

Contacted through. Visiting Nurse Association

	NAME	AGE	NATIONALITY	OCCUPATION	EDUCATION — REMARKS
Father . . .	J.	26 yrs.	American	Painter	Grad Grammar school and Trade school
Mother . . .	A.	24 yrs.	American	Billing clerk before marriage	H. S. three years
M. G. F. . .	W.	49 yrs.	American (German)	Flyman at theatre	About grammar school
M. G. M. . .	C.	dead	American (Irish)	Housewife	Grad grammar school
P. G. F. . .	J.	dead	German	Worked in factory	Educated in Germany (city), shoemaker in Germany
P. G. M. . .	E.	65 yrs.	German	Housewife	Educated in Germany, servant there before married
Brothers or sisters . . .	none				

House or apartment: rent or own	Piano: no	Concerts: no
Rooms: 5	Victrola: no	Lectures: no
Servants. sends heavy laundry	Radio: yes	Automobile: Ford (when goes)
No. people: 4 (mother's father)	Clubs: St Boniface	Sports: no
Books: mother reads novels from library	Church: Catholic	Theater: "seldom", once a week to movies
Magazines: Pictorial Review		Goes to theater to see musical comedy once in a while (on pass)
Newspapers: Register and Journal Courier		
Summer vacation: no		
Family Physician: Dr. —		

General characterization (see memo for details): Home: clean, neat, average. They have their meals at her husband's home on — Street and Mrs. — spends most of her time there. Seems to be some friction between Mr and Mrs. —

TABLE 9

STATISTICS CONCERNING THE HOME AND INTERESTS OF THE PARENTS

(Percentages are based on cases reporting, not total cases. Number of cases not reporting is indicated in each instance.)

Type of Home 79 per cent rent an apartment
 11 per cent rent a house
 10 per cent own a house
 1 case not reporting

Number of Rooms in Home 2 3 4 5 6 7 8 9
 Percentage of cases 2 11 33 34 15 3 1 1
 Average: 4.69 rooms; 9 cases not reporting

Number of People Living in Home 3 4 5 6 7 8 9
 Percentage of cases: 39 31 16 6 2 4 2
 Average: 4.02 people; 25 cases not reporting

Assistance with Housework 42 per cent send out the laundry
 4 per cent have a washing machine
 2 per cent have someone to help
 52 per cent have no help
 16 cases not reporting

TABLE 9—*Continued*

<i>Books Read</i>	45 per cent read fiction 7 per cent read non-fiction 10 per cent read both 38 per cent do not specify 20 cases not reporting	
<i>Number of Magazines Read</i>	Percentage of cases: 1 2 3 4 5 6 7 do not specify 24 21 26 13 1 3 1 11 12 cases not reporting	
<i>Number of Newspapers Taken</i>	58 per cent take 1 daily 18 per cent take 2 dailies 1 per cent take 3 dailies 7 per cent take 1 daily and 1 Sunday	1 per cent take 1 daily and 2 Sunday 3 per cent take 2 dailies and 1 Sunday 1 per cent take 3 dailies and 2 Sunday 11 per cent do not specify
<i>Piano in Home</i>	19 per cent have	6 cases not reporting
<i>Victrola in Home</i>	40 per cent have	11 cases not reporting
<i>Radio in Home</i>	62 per cent have	6 cases not reporting
<i>Club Affiliation</i>	41 per cent belong Of that number 85 per cent belong to 1 club 12 per cent belong to 2 clubs 3 per cent belong to 3 clubs	
<i>Church Attendance</i>	99 per cent attend Of that number 43 per cent are Protestant 49 per cent are Catholic	6 per cent are family divided 2 per cent do not specify
	Of the Protestants 12 per cent are Lutheran 17 per cent are Methodist 2 per cent are Methodist-Episcopalian 17 per cent are Episcopalian 9 per cent are Baptist 5 per cent are Presbyterian	2 per cent are Christian Scientist 12 per cent are Congregationalist 2 per cent are Universalist 5 per cent are family divided 17 per cent do not specify
<i>Concert Attendance</i>	14 per cent do attend	16 cases not reporting
<i>Lecture Attendance</i>	12 per cent do attend	16 cases not reporting
<i>Automobile</i>	33 per cent own one Of that number 10 per cent have a Chevrolet 18 per cent have a Ford 10 per cent have a Buick 3 per cent have a Nash 3 per cent have an Essex	3 per cent have a Chrysler 3 per cent have a DeSoto 3 per cent have a Flint 47 per cent do not specify 9 cases not reporting
<i>Sport Interest and Participation</i>	61 per cent are interested and participate 11 cases not reporting	
<i>Theater Attendance</i>	91 per cent attend 11 cases not reporting 61 per cent attend movies 7 per cent attend both movies and legitimate 32 per cent do not specify 33 per cent go frequently 40 per cent go occasionally 27 per cent do not specify	
<i>Vacations</i>	43 per cent have vacations Of that number 32 per cent have vacation regularly 20 per cent have vacation occasionally 48 per cent take short trips (weekends, etc.) 25 cases not reporting	

Environment and Interests of Parents. Other information concerning the interests, life, and home surroundings of the parents is summarized in Table 9. There is no available basis for estimating the significance of these data, but it is evident that the intellectual and cultural interests represented are near an average level.

The Intelligence of the Parents. There was no attempt made to determine the parents' intelligence by a standard test or rating scale. The inaccessibility of the father and the self-consciousness imposed on the mother by turning our attention to her rather than to the child were factors which prohibited our seeking such information.⁴ Moreover we were not primarily interested in intelligence *per se*, or even in intelligence as ordinarily measured. In spite of the fact that we have no standard measure of the parents' intelligence, the combined facts of occupation, schooling, home recreations, and interests suggest that we have a selection of infants whose parents have average and normal intellectual endowment.

Nationality of Parents. To ascertain the racial inheritance of the infants under investigation or to insure homogeneity of race was impossible. As far as we know, the subjects were all of pure white race. What further consistency was attained was secured by limiting the nationalities represented. The parents were all born in this country, while the grandparents were either born in this country and were of northern European extraction, or were born in northern Europe. Table 10 gives the nationality of the grandparents. One serious exception to our standard will be noted: a case in which there was French ancestry on both maternal and paternal side. This infant was examined but once. Two other cases had part southern European ancestry; one French-German and the other Italian-German. Both of these cases were examined only once. Hrdlicka⁵ has used the designation "Old Americans" to describe the third generation of northern Europeans residing in the United States. The group used for this study, while largely composed of such individuals, cannot completely claim that characterization. It can be said, however, that in general the parents were of northern European extraction and, in so far as this represents homogeneity of race, to that extent have we been successful in limiting the racial ancestry of our subjects.

⁴ In a few instances we recorded the mother's exact language in reply to our interview questioning. Unfortunately this practice was not continued; it would have been of special value later in comparison with the child's language development, although as a measure of parent intelligence it would have had limitations.

⁵ Hrdlicka, Aleš: *The Old Americans*. Baltimore. Williams and Wilkins, 1925. Pp. xii + 438.

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TABLE 10
THE NATIONALITY OF THE GRANDPARENTS

NATIONALITY OF MOTHER'S PARENTS	NATIONALITY OF FATHER'S PARENTS		No. of Cases
	Can.-Ind -Native	Danish	
English	1	2	1
English-Canadian	1	1	1
English-Canadian	1	1	1
English-Dutch-French	1	1	1
English-English descent	1	1	1
English-Irish-Indian	1	1	1
English-Irish-Quaker	1	1	1
English-Native	1	1	1
English-Scotch-Irish	1	1	1
French	1	1	1
French-Canadian-Native	1	1	1
German	1	1	1
German-Swiss	1	1	1
German-English	1	1	1
German-Irish	1	1	1
German-Irish descent	1	1	1
German-Lithuanian	1	1	1
Irish	1	1	1
Irish descent	1	1	1
Irish-English	1	1	1
Irish-English	1	1	1
Irish-Native	1	1	1
Italian	1	1	1
Native-United States	1	1	1
Polish	1	1	1
Scotch	1	1	1
Scotch-English-Canadian	1	1	1
Scotch-Irish	1	1	1
Scotch-Irish-Native	1	1	1
Scotch-Native	1	1	1
Spanish-Native	1	1	1
Swedish	1	1	1
Swedish-Native	1	1	1
German-Native	1	1	1
Irish-German-Native	1	1	1
Number of cases	1	1	107 Total

Age of Parents. On the first visit to the Clinic we inquired concerning the age and health of the father and mother and their approximate height and weight. No unusual physical disturbances were reported. The mothers' ages varied from 17 to 42 years, the average for all of the cases being 27 years. As was to be expected, the average age of the father was slightly older, 30 years, and there was a greater age range — from 21 to 55 years. Table 11 gives further statistics and separate figures for the parents of the boy and girl infants.

TABLE 11
AGES OF THE PARENTS

No Cases		GIRLS		BOYS		GIRLS AND BOYS	
		58	49	49	107	107	107
Mother's age	Average	26.89		27.28		27.07	
	Standard deviation	5.86		5.81		5.83	
	Range	17-42		17-40		17-42	
Father's age	Average	30.17		29.98		30.08	
	Standard deviation	6.72		4.90		6.08	
	Range	21-55		21-44		21-55	

Previous Pregnancies. Further data concerning parentage included a history of former conceptions (Table 12). Forty-three per cent of the cases represented first pregnancies; in 51 per cent of the cases there was at least one older living child in the family. No instances of multiple birth were included.

TABLE 12
OFFSPRING OF PARENTS

OLDER LIVING CHILDREN													
Older living children	.	0	1	2	3	4	5	6	7	8	9	10	Total
Number cases	.	52	31	9	5	6	0	1	2	0	0	1	107

PREVIOUS PREGNANCIES													
Previous pregnancies	.	0	1	2	3	4	5	6	7	8	9	10	Total
Number cases	.	46	34	11	4	7	1	0	1	1	0	2	107

The Prenatal History. The prenatal history included data about the last menstrual period, general health during pregnancy, and birth date. Since the length of the gestation term is known to affect development, especially during

the first postnatal year, we retained only those cases whose history indicated a prenatal term of normal duration. Because the exact time of conception is undeterminable, the gestation period is more or less indefinite. Probably the best indication of term is the length of time from the last menstrual period to birth. This was used as our first criterion of age from conception. We finally adopted the general practice of calling all children full-term infants if they were born within two weeks of the commonly accepted normal period of 280 days, or 40 weeks, and if their birth weight and physical appearance were within normal limits. Four cases⁶ whose mothers' menstrual histories were at variance with the other criteria were included in the belief that in these instances the menstrual history was not a reliable indication of the time of conception.

TABLE 13
DEVIATION IN DAYS FROM A STANDARD PREGNANCY PERIOD OF TEN LUNAR MONTHS

	BEFORE EXPECTED DATE							EXPECTED DATE						
Days of deviation .	24	19	14	11	10	9	8	7	6	5	4	3	2	1
Number of cases	2	1	1	1	0	3	0	3	2	7	3	5	5	5
	3 Cases 2 8%		5 Cases 4 7%											
	AFTER EXPECTED DATE							TOTAL						
Days of deviation	1	2	3	4	5	6	7	8	9	10	24			
Number of cases	9	6	7	10	4	5	5	3	0	1	1	107		
	94 Cases 87 8%							4 Cases 3 8%			1 Case 0 9%		100%	

* In three cases no menstrual history was obtainable Other factors in the birth history suggested normal periods.

⁶ The birth history concerning these exceptional cases showed a deviation greater than two weeks from the gestation term as calculated by the menstrual history: G 29. Born in hospital, July 16, 1929 Last menstruation period September 17, 1928. Birth date expected, June 24. Birth weight 3 2 kg. No other measurements taken Physician's comment: full term. G 31. Born in hospital, July 27, 1929 Last menstruation period November 8, 1928 Birth date expected, August 15. Birth weight 2 73 kg. Length 50.5 cms. Physician's comment: gestation term 9 mos G 42. Born in hospital February 14, 1927. Last menstruation period June 3, 1926. Birth date expected, March 10th. Birth weight, 3 35 kg No other measurements taken Physician's comment: gestation term 9 mos. B 14. Born in home December 19, 1928 Flowed during pregnancy. Doctor expected birth date January 12, 1929. Birth weight not taken. No other measurements taken. Physician's comment. no signs of prematurity at birth.

In 96 per cent of the cases the deviation from the expected birth date was within two weeks; and in 88 per cent it was within one week (Table 13).

TABLE 14

CONDITIONS AND PLACE OF BIRTH

NUMBER CASES	CONDITIONS	PLACE OF BIRTH
79 . . .	Normal spontaneous (1 had broken collar bone)	Hospital . . .
13 . . .	Lower or mid forceps (1 cyanosed, 1 breech, 1 did not nurse immediately)	Home . . .
8	History meager (1 cyanosed)	Total . . .
2	Caesarian section	
2	Precipitate (1 breech)	
1	Version	
2	Dry labor	
107 Total		82 cases
		25 cases
		107 cases

TABLE 15

BIRTH SEASON* OF CASES EXAMINED AT EACH AGE LEVEL

AGE IN WEEKS	SPRING		SUMMER		FALL		WINTER		TOTAL	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
4	5	6	8	2	1	3	2	5	16	16
6	4	5	7	2	1	3	2	5	14	15
8	4	5	7	2	1	3	2	4	14	14
12	4	5	6	2	1	3	2	3	13	13
16	5	8	6	2	5	8	10	5	26	23
20	5	6	1	2	4	6	7	7	17	21
24	5	4	3	5	4	5	4	7	16	21
28	6	4	4	5	4	7	1	2	15	18
32	5	7	4	6	2	3	4	2	15	18
36	6	10	3	3	0	0	8	5	17	18
40	6	8	3	4	1	1	10	4	20	17
44	6	7	3	4	1	2	7	3	17	16
48	6	7	3	4	2	5	8	3	19	19
52	7	8	5	6	4	7	6	5	22	26
56	3	5	5	2	3	3	4	3	15	13

* Spring March 21 through June 20, Summer June 21 through September 20, Fall September 21 through December 20; Winter December 21 through March 20.

Birth History. Twenty-five of the infants were born at home; eighty-two cases were delivered in hospitals. No case was included where there was any evidence of what would be medically termed "birth injury." All cases were single births. Table 14 tabulates the general summary of birth conditions. The birth weights of the male infants varied from 2500 to 4480 grams; of the female infants, from 2335 to 4450 grams. The averages have not been determined because the home weight records are only approximate.

The seasonal character of growth makes the birth month significant. Table 15 gives the birth season of the subjects examined at each age level. Separate tabulations have been made for the boy and girl infants in order to facilitate the study of relative physical growth changes of the two sexes.

Physical Conditions and Health History. We selected only physically normal infants for the study. Two infants in the group were supposedly tongue-tied; one had the tongue clipped at 12 weeks and the other at 24 weeks. We accepted no case of outstanding physical abnormality such as club feet. A case of mild pyloric stenosis and one of rather severe eczema, as well as several cases of decided malnutrition, were excluded. No examination was included in the analysis if there were evidences that the behavior was affected by the child's physical condition. Nevertheless when the health records were analyzed it was found that during the four-week period between examinations many physical disturbances were experienced. Table 16 lists all of the physical difficulties reported. Naturally some children were reported for more than one disturbance. Teething was checked only when swollen gums or teeth eruption was accompanied by unusual fretfulness or some more serious evidence. The common cold was the most frequently reported illness. After 12 weeks at least one fifth of the cases were reported to have had a cold, coryza, or cough in the four-week interval prior to the examination, and from 24 weeks on, more than half of the cases had had a cold between birth and the time examined.

All of the disturbances, however, can be classified as minor. How much minor physical difficulties distort behavior growth is not known and cannot be ascertained from this study.

Age. Although we allowed a deviation of 14 days in the gestation term, we adhered closely to the birth date in all age reckonings. Ninety-six per cent of the cases were examined within two days of the exact examination day. The few cases of greater deviation are shown in Table 17.

In summary, then, the claim that the group is highly homogeneous is fairly well substantiated. It should be again pointed out that this fact lends a statistical reliability to the data quite beyond that of a study involving the same number of cases but representative of the population in general. Our follow-up studies of the normative infants and our clinical impression of infants drawn from other sections of the population confirm our belief that a well-delimited selection of subjects was achieved.

THE PSYCHOLOGY OF EARLY GROWTH

TABLE 16

AGE DISTRIBUTION OF PHYSICAL DISTURBANCES

The first column under each age gives the percentage of children for whom a disturbance was reported at any time prior to an examination. The second column lists the actual number of children in whom a disturbance occurred within the four-week interval prior to the examination.

	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56	% No.												
Accident	
Acute infection	
Conjunctivitis	
Gripe	
Respiratory infection	
Bronchitis	
Cold	
Fever	
Laryngitis	
Outis	
Sore throat	
Disturbance of gastro-intestinal tract	
Constipation	
Diarrhea	
Digestive upset	
No appetite (anorexia)	
Congenital	
Hernia	
Operation (circumcision or tongue-tie cut)	
Other disturbances	
Chickenpox	
Fever	
Scurvy (mild)	
Skin trouble	
Teething	
Whooping cough	
Immunization	
Diphtheria	
Measles	
Smallpox	
Total cases:																												
No illness		24	26	22	23	34	24	25	20	18	24	17	19	18	22													
At least one illness*		8	3	6	3	15	14	12	13	15	11	18	14	20	15													
Percentage		25	10	21	12	31	37	32	39	46	32	49	42	53	54													
At least one illness*																												

* One case may, of course, have more than one of the illnesses listed above.

TABLE 17
FREQUENCY OF DEVIATION OF ACTUAL BIRTH AGE FROM ASSIGNED EXAMINATION AGE

AGE DEVIATION (+ OLDER) (- YOUNGER) IN DAYS	AGE IN WEEKS															TOTAL
	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56	
+ 5	.	..	..	.	..	..	..	.	..	..	1	.	..	1	.	1
+ 4	.	..	..	..	1	1	1	..	..	..	1	1	..	1	1	3
+ 3	.	.	..	..	1	1	1	..	..	..	4	1	..	1	2	11
+ 2	5	3	7	5	11	9	8	4	6	4	5	2	5	5	4	83
+ 1	6	4	4	3	7	5	10	4	4	7	7	6	6	12	1	86
0	9	12	6	6	9	12	8	11	11	8	9	10	14	9	4	138
- 1	9	5	5	4	11	7	8	9	6	10	6	10	7	7	11	115
- 2	1	5	6	8	9	4	2	4	6	6	5	2	6	12	4	80
- 3	2	..	..	..	1	..	..	1	..	..	..	1	..	..	1	6
- 4	.	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
- 5	.	..	..	..	..	..	..	..	..	..	..	..	..	..	0	0
Total number cases	32	29	28	26	49	38	37	33	33	35	37	33	38	48	28	524

CHAPTER IV

THE BEHAVIOR EXAMINATION

THE behavior examination was the main source of data for the present study; all other information was considered essentially supplementary and was used primarily for correlation or corroboration. Every effort was therefore directed toward obtaining natural and characteristic modes of response in the controlled behavior situations. The procedure and the objective were experimental in the sense that the situations were designed "to produce intentionally a normal process for our observation."¹ Painstaking efforts were made to keep the procedure standardized and systematic; occasional variations, however, were permitted in order to preserve optimal emotional conditions in both parent and child. In this we enjoyed marked success, as is indicated by the almost uniform co-operation of the parents and the sustained output of creditable performance on the part of the infants.

At almost every age, approximately a third of the infants made excellent adjustment to the entire experience at the Clinic, including physical measurements. Reference to the Clinic Day summary table, page 13, indicates a small percentage of children who fretted at some time during their entire sojourn at the Clinic. But even these children adjusted and responded for long periods. Instances of marked resistance were rare. Nearly always after a period of initial adjustment, the infant began to exploit the situations with eagerness. Fretfulness was most likely to occur with fatigue and in the postural situations when the infant was unsuccessfully striving for a lure. After a feeding or nap, or both, he was again ready to display his capacities. Respect for the infant's usual routine, as well as a regard for the distinctive emotional characteristics of each parent and child, were largely responsible for the satisfactory performances elicited.

As we have indicated, the behavior examination was the pivotal event of the Clinic visit. The examination, usually conducted in the Photographic Dome (Fig. 1), was begun as soon after the infant's arrival at the Clinic as

¹ Durken, B.: *Experimental Analysis of Development*. New York: Norton, 1932. Pp. 288. (See pp. 22-25.)
34

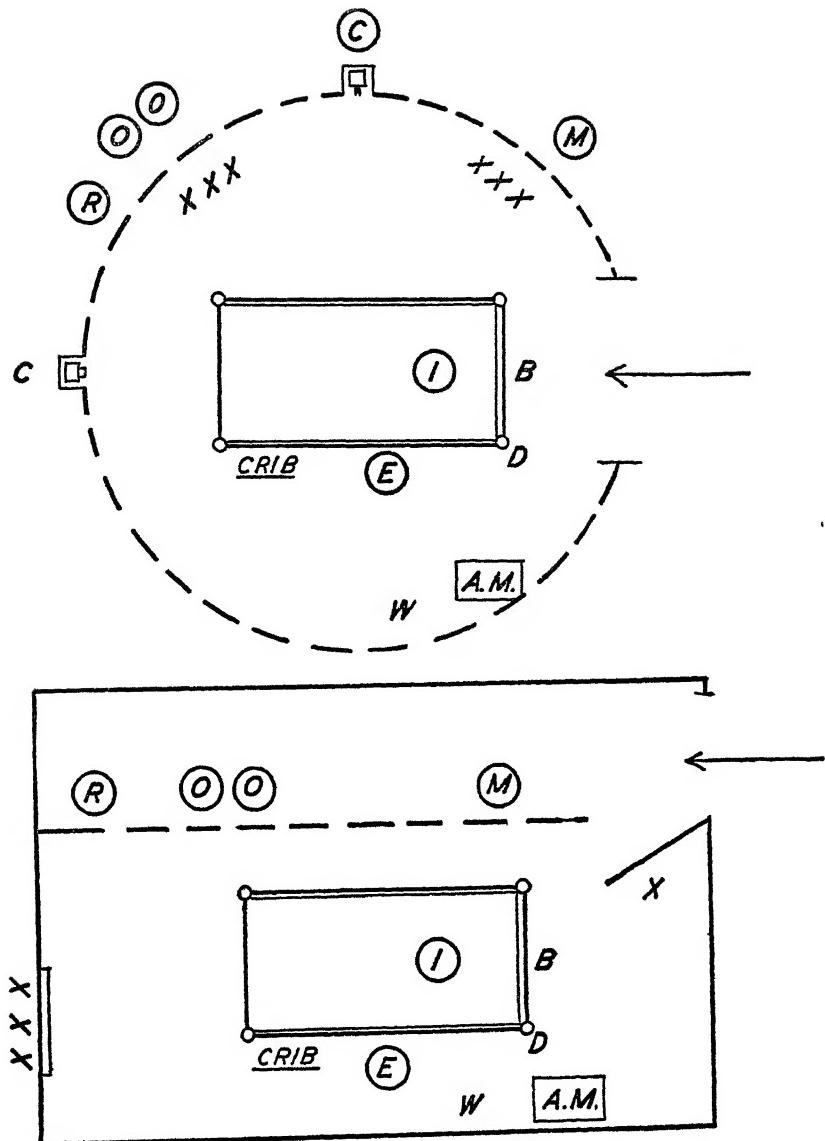


FIGURE 1—EXAMINATION ARRANGEMENTS

Diagrams showing the Arrangements of the Photographic Dome and the Supplementary Examining Room—
scale approximately $1\frac{1}{2}$ to 1"

(R) = Recorder's station;* (C) and C = Camera operator's station
(M) = Mother's station, (I) = Infant

B = Materials Bag (attached to crib)
D = Disposal bag (attached to crib)

A.M. = Additional material: chair, blotters, table top, performance box

W = Waste basket

(E) = Examiner

XXX = Lights

(O) = Observers' stations

----- = One-way-vision screen

* The recorder took an inconspicuous station at the recording desk. She used a stop-watch for the time entries of her record. She assisted in incidental ways, chiefly before and after the examination.

was deemed expedient. The general procedure for establishing initial rapport has already been described. Specifications for the examination room, apparatus, and special test toys are given on following pages.

The Home Examination. The procedure for the home examination was essentially similar to that instituted at the Clinic. The portable examining table took the place of the crib, the window substituted for the dome lights, and the examiner's smock pocket served in place of the material bag to retain the test toys. There was no one-way-vision screen to conceal the stenographer and mother, but the limited visual capacities of the 4 and 6 weeks old infants made this a relatively unimportant factor. If necessary, however, the flap on the examining table was used to confine the infant's range of vision on one side while, on the other side, the neutral background of the examiner's smock made an effective visual barrier. Inasmuch as the young infant's head is predominantly turned to one side, the examiner took her place at that side. The flap was only occasionally needed.

Examination Continuity. The continuity of the observations from age to age was preserved by presenting a given situation at successive age levels. The order of situations was strictly adhered to except in the case of the advanced postural activity. This part of the examination was conducted in a more informal manner. Here the child's lead was frequently followed. Although the routing of all the situations was predetermined, the transition from one to another was executed in as natural and unobtrusive manner as possible. It sometimes requires real diplomacy on the part of the examiner to avoid taxing the infant's patience too greatly as one enticing object after another is presented, only to be removed while it still retains considerable lure for him.

Interruptions. During an unavoidable interruption (as when the infant urinated and the canvas chair coverings and blotter needed to be changed) the infant was held either by the mother or examiner. In some cases he was permitted to retain the toy with which he was occupied.

The Duration of the Examination. The length of the examination was naturally adjusted to the child's endurance. It gradually increased in duration from an average of 15 minutes at 4 weeks, to 42 minutes at 20 weeks, and to 60 or 75 minutes at the end of the first year. The examination period was usually continuous from 4 through 12 weeks, but after that there were frequently one or two intermissions. The continuity of the situations was of course preserved.

§1. EXAMINATION EQUIPMENT

The examination equipment included a clinical crib, an array of test materials contained in a materials bag hung over the head end of the crib (Fig. 2), a disposal bag for receiving the materials when child and examiner were through with them. The accompanying photographs (Figs. 5-12) illustrate this equipment. Figure 11 indicates the standard method used in the presentation of the test materials. Figure 12 calls attention to the standardized location points which will be referred to in the description of the examination procedures.

The Disposal Bag. Attached to the side of the crib is a bag in which the materials may be placed after they have been handled by the infant,—a sanitary precaution to obviate the necessity of sterilizing the bulky material bag after each examination.

The Platform Covering. At 8 and 12 weeks the canvas frame, over an inch layer of cellulose tissue, was placed on the crib platform and formed the surface on which the infant lay during the examination. The tautness of the canvas made a resistant, yet not too hard, surface for the infant to lie on. At subsequent age levels a blotter over a rubber covered quilted padding was sufficient to protect the infant from the bare platform. This formed a more resistant surface for the infant's increased activity. The covering was left in place when he was seated either in the examining chair or on the platform but was removed for the observation of advanced postural activity.

The Examining Chair. Placement in the chair was contingent upon adequate head control. At the age of 12 weeks all but one infant was placed for a brief period in a sitting position before the table top. The examining chair was used at those ages when infants were yet unable to sit unsupported and also in a few cases when the child was able to sit alone, but needed this restriction to direct his activity to the table top. When the infant had acquired a certain ability to maintain his balance while sitting, he was placed unsupported on the platform until he showed signs of fatigue or evidences of imbalance and then the chair was brought into use. Reference to page 132 will show that the chair was used in 85 per cent of the cases at 32 weeks, but thereafter in less than half the cases; by 56 weeks it was entirely discarded (Fig. 7).

Portable Examining Table. An infant's folding dressing table, 32 inches high, 20 inches wide, and 33 inches long, was used in place of the crib for the examinations in the home. When opened and set up, the canvas top is taut.

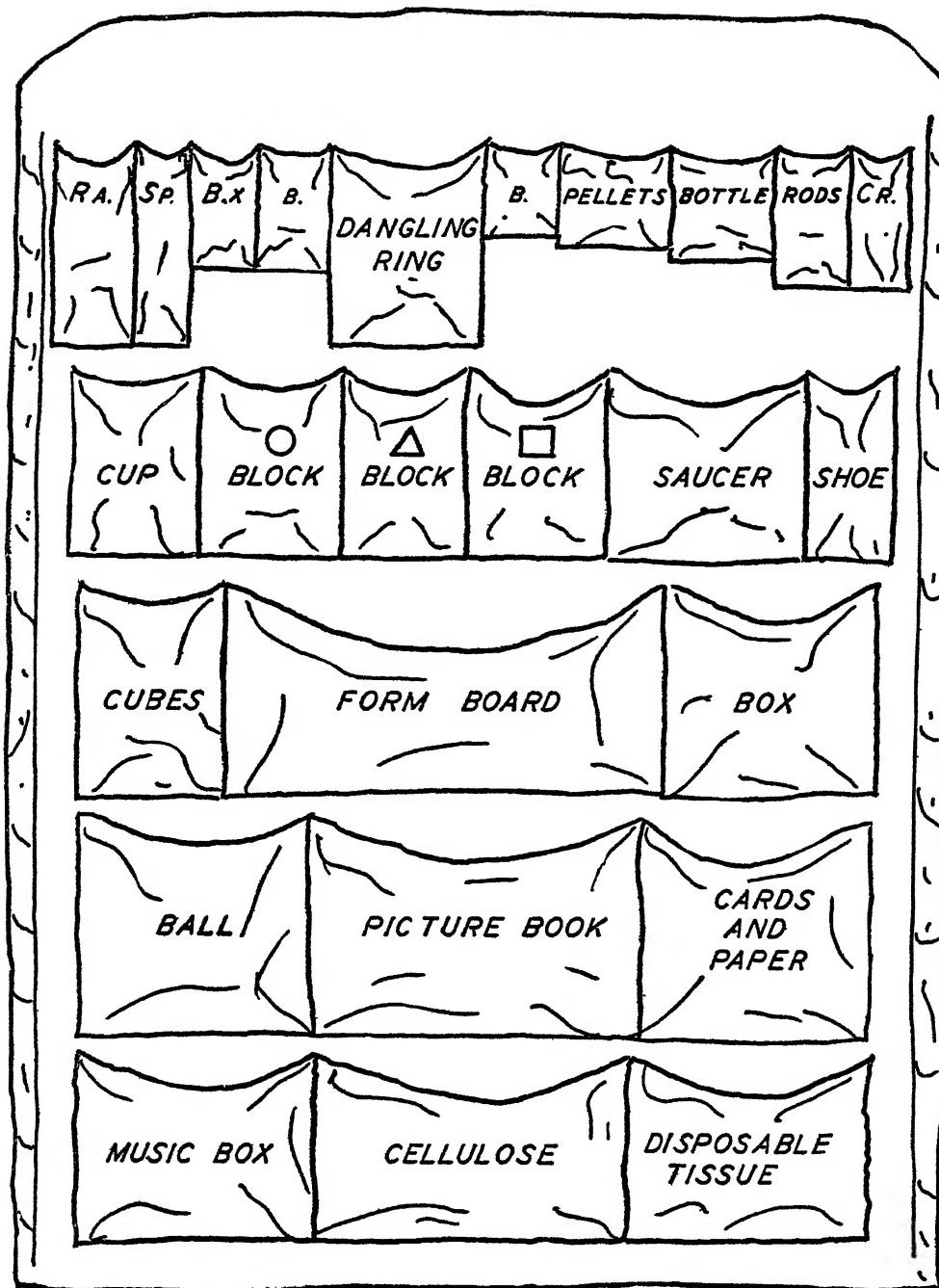


FIGURE 2—MATERIALS BAG

Placed on this was a piece of rubber sheeting and over it a pad which could be easily changed. Attached to one side was a canvas flap, consisting of an envelope of canvas fitted over a wire. The ends of the wire were inserted in holes at both ends of one side of the table so that the flap could be folded up or let down out of sight. This flap was raised, particularly during the dangling ring situation, to eliminate the possibility of stimulation from objects in the room (Fig. 8).

§ 2. THE EXAMINATION MATERIALS (Figs. 9, 10)

The examination materials consisting of some 24 simple items are listed alphabetically below and are pictured in the accompanying photographs:

Ball — white rubber with narrow red and green stripes encircling the middle. Protuberances on surface. Diameter 6 cm. (SR-4560, Seamless Rubber Co., New Haven, Conn.)

Bell — chromium plated, black wooden handle. Bowl, outside diameter 4.4 cm., handle 5.2 cm. in height.

Bottle — glass, 7 cm. in height, 2 cm. in diameter at opening. One-ounce iron mold.

Crayon — red lumber. Eberhard Faber No. 836.

Cube — wooden (white wood), bright red,² 2.5 cm. square.

Cup — white enamel with black handle. 9.5 cm. in diameter at top. 6 cm deep. Size 9.

Dangling ring — wooden embroidery ring, 11 cm. diameter at outer edge, bright red, string 25 cm. long attached. (Duchess-felt cushion embroidery ring, 4 inches — Stern Bros., New York.)

Formboard — made of half-inch board 36 × 16 cm., stained dark green.² Three holes cut equidistant from each other and from edges of board from left to right as follows: Circle, diameter 8.7 cm.; equilateral triangle each side 9.3 cm.; square, 7.5 cm. Three white wooden forms to fit above holes, each 2 cm. thick: circle diameter 8.5 cm.; equilateral triangle, 9 cm. on side, square, 7.3 each side.

Mirror — attached to back of crib and covered by a roller shade.

Music box — a wooden Swiss music box playing two tunes.

Paper — green Hammermill bond No. 16, 8.5 × 11 inches.

Pellet — white sugar, flat on one side, convex on other. Diameter 8 mm. (Cachous — Bradley-Smith Co., New Haven).

Performance box — wooden box, painted green,² length 38 cm., width 24.7 cm., height 17.6 cm., open only at one end. Ends 24.7 × 17.6 cm. Top of box is 38 × 25 cm. 8 cm. from closed end of box is rectangular hole 2.5 × 7.6, short side of rectangle parallel to long side of box. 18 cm. from closed end of box is round hole, diameter 2 cm. 27.5 cm from closed end of box is a rectangular hole 3.2 × 2 cm., long side of hole parallel to long side of top of box. Measurements for placement of holes are made from closed end of box to nearest side of hole. The geometric center of all holes is on a line which bisects the top lengthwise. Use with per-

² Paint: red — U. S. Deck paint and No. 40 Liberty Red
green — U. S. Marine green, A 52.

formance box, wooden rod (as described) and white square wooden form (as described). The performance box is equipped with a handle as pictured in Fig. 11.

Picture cards — (1) white card 5.75×5.25 inches, divided by black lines into four equal rectangles; each rectangle contains a drawing. Drawings of: cup, shoe, dog, and house.

Picture cards — (2) white card 5.75×5.25 inches, divided by black lines into six equal rectangles; each rectangle contains a drawing. Drawings of: flag, clock, star, leaf, basket, book.

Rattle — blue and white celluloid. Bowl 6.8 cm. in diameter. Handle 9.6 cm. in length (Woolworth's 5 and 10).

Round rod — wooden, painted red,² length 10 cm., diameter 1 cm.

Saucer — white enamel, saucer 14 cm. in diameter.

Shoe — infant's shoe (Woolworth's 5 and 10).

Sleigh bells — nickel-plated cat bells on curtain ring. (Bells: $\frac{1}{2}$ ".)

Snapper — green cricket.

Spoon — standard-size aluminum teaspoon. (Victoria Aluminum No. 986.)

Stairs — wooden steps painted grey. Base 32.5 inches, height 23 inches, tread, first 7.5 inches, second 7.5 inches, third 10.75 inches, fourth 7.5 inches. Rise 5.75 inches.

Tricolored rings — red, white, and blue interlocking rings, 4 cm. in diameter.

Wooden box — painted bright red.² Outside measurements: 8.6 cm. wide, 9.9 cm. long. Thickness of wood, 0.6 cm.

Baby talcum.

Disposable cleaning tissue.

Accessories in the Materials Bag. In addition to the usual test toys, the materials bag was provided with a can of talcum powder. This was needed for the pellet situation when the child's hands were dusted with talcum to prevent adherence of the pellet. Sheets of disposable tissue are convenient for wiping the infant's nose or face. One of the pockets contained a music box for incidental uses. In another pocket were a set of teething rings, three small hard rubber rings, red, white, and blue, linked together; and in yet another, a shower curtain pin carrying three cat bells. These supplementary toys were used in establishing rapport and maintaining an equable adjustment. The performance box, too large to be placed with the other objects in the materials bag, was located with the other large necessary accessories.

§ 3. ORDER OF THE EXAMINATION

When the examination room was in complete readiness the mother was conducted into it carrying the child wrapped in a blanket. Under the examiner's instructions, the mother placed the child on the crib, and if the infant had not already been completely undressed, the mother removed the remainder of his

² See footnote on page 39.

THE BEHAVIOR EXAMINATION

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ROUTE SCHEDULE FOR NORMATIVE EXAMINATIONS

**READ ACROSS TO ASCERTAIN THE AGES AT WHICH A GIVEN SITUATION WAS USED.
READ DOWN FROM THE TOP OF ANY GIVEN AGE COLUMN TO ASCERTAIN THE
SEQUENCE OF SITUATIONS AT THAT AGE**

FIGURE 3 - ROUTE SCHEDULE FOR NORMATIVE EXAMINATIONS

NOTE. A situation is optional for the ages indicated by a broken line.

clothing. The examination then proceeded according to a schedule which was suited to the age level of the child. The schedule followed is indicated on the diagram (Fig. 3), which includes a few situations later discarded.

The sequence of the situations adopted was determined after preliminary trial and was planned to increase the comparative value of the observations at successive age levels. Relatively naturalistic observations were secured first. Simple situations preceded complex ones. Situations involving social contact beyond that essential for working rapport were delayed until the less personal responses were obtained. Postural control was observed at convenient and appropriate times, although postural activity was not induced until the end of the examination. If the conditions of presentation or a fortuitous response altered the situation abnormally, the examiner reinstated the situation at discretion. The order of presentation of the situation was otherwise strictly adhered to and the unity of the total examination was preserved by making a transition from one situation to the other as natural as possible.

§ 4. EXAMINATION PROCEDURES

All told, a score of situations figured in the normative behavior examinations. These situations are herewith described and for convenience are arranged in alphabetic order.

A general description of the conduct and management of the examination has already been made. The actual procedure used in instituting the individual observation situations will now be specified in detail. For grammatical convenience and for brevity these procedures are expressed in the direct imperative mood.³ The detailed directions here given should be regarded as concise descriptions of the experimental conditions under which the systematic observations were made.

³ The various location points referred to in connection with the examination are as follows:

- s m — The standard median position is the location point (position) most frequently used in the presentation of materials. This point is located in the middle of a line drawn transversely on the table top parallel to and 16.5 cm. from that edge of the table top which is nearest the child, as pictured in Fig. 11.
- n m — The near median position is a position on the table top in the median plane midway between the standard position and that table edge nearest the child.
- f m — The far median position is a position on the table top in the median plane midway between the standard position and that table edge farthest removed from the child.
- r s m — The right standard median position is a point (position) approximately midway between the standard median position and the right end of the transverse standard line.
- l s m — The left standard median position is a point (position) approximately midway between the standard median position and the left end of the transverse standard line.
- h l.c — Represents the position usually taken by the examiner on the presentation of the material, namely, near the left corner of the head end of the crib

In general the following rules apply to all situations:

- (1) Always secure the child's attention to the place of presentation before bringing the object into view.
- (2) Hold the object in a manner to permit the infant a full view of it as it is presented. For instance, if the object is a small one, hold it between index finger and thumb with the other fingers drawn back. When two objects are presented simultaneously, be careful to hold the arms so that the child has a full view of the objects as they are brought into place.
- (3) Bring objects into view at the far table edge and advance them along the median line and place them in the standard position.
- (4) Always permit the child full opportunity to react to and to exploit the situation before removing the stimulus object. Do not always expect immediate response. At certain ages overt responses may be relatively long in appearing.
- (5) *Keep the precautions listed on pages 65-66 constantly in mind.*

The standard procedures used in the behavior examinations are pictured herewith by means of action photographs (Figs. 13-17). These photographs have been selected from 16 mm. film records of normative examinations and are arranged to show salient phases in the management of the examination and in the maneuvers of the examiner. This delineation should be studied in connection with the associated textual instructions for the individual behavior situations.

For a more complete demonstration of the procedures the reader may again be referred to the motion picture films which depict the normative investigations.⁴ One of these talking films gives an almost complete rendering of an examination at one year. A silent film (16 mm.) deals in more detail with the procedures as outlined in the present chapter. A special series of silent films (16 mm.) gives a full rendering of the behavior of the normative infants as outlined in Volume One of *An Atlas of Infant Behavior*. This latter series consists of 25 reels (varying in length from 60 to 300 feet), each reel presenting a separate situation.

⁴ THE YALE FILMS OF CHILD DEVELOPMENT: (1) The Study of Infant Behavior. A talking film in 2 reels, 35 mm., 2,000 ft.; also 16 mm. New York. Erpi Picture Consultants, Inc., 1930. (2) The Growth of Infant Behavior: Early Stages. A talking film in 1 reel, 35 mm., 1,000 ft., also 16 mm. (3) The Growth of Infant Behavior: Later Stages. A talking film in 1 reel, 35 mm., 1,000 ft.; also 16 mm. (4) Behavior Patterns at One Year. A talking film, 1 reel, 35 mm., 1,000 ft., also 16 mm. New York. Erpi Picture Consultants, Inc., 1934

See the descriptive bibliography of The Yale Films of Child Development in Appendix.

BALL PLAY

(36 weeks-56 weeks)

Preceding Situation. Cup, shoe, and box.

Conditions. The crib is bare; right crib panel is fully raised; left, half raised.

Procedure. (1) Place the infant in the sitting position with his back near the head end of the crib, so that he cannot fall backward. The infant faces the foot end and his legs are somewhat spread apart. With running comment, roll the ball to the child slowly in a manner which will favor his interception of it. If necessary, even lightly toss it between his legs so that he will actually secure it.

(2) After he has grasped it, encourage him to return the ball; stretch out a receiving hand across the end of the crib, beckoning him to roll the ball toward you.

(3) If he still retains the ball, take hold of it; then, if he does not release it, gently remove it by pressing it out of his hands so that it rolls or falls out of his grasp in a manner suggesting responsive release.

(4) Again initiate the game as before and repeat the procedure three or more times to determine the nature and the degree of his response.

NOTE: The examiner should make a social, playful approach in contrast to the more restrained attitude maintained in the other situations.

BELL

(16 weeks-56 weeks)

Preceding Situation. Pellet and bottle.

Conditions. The child is supported in the chair or is sitting on the crib platform. The table top is in place.

Procedure. (1) Present the bell in the standard manner and place in the s.m. position.

(2) If the child does not contact or secure the bell after 10 seconds, place it in the n.m. position.

(3) After observation of the child's manipulation of the bell, demonstrate bell ringing, securing his initial visual regard to the demonstration. Seize the bell with vertically directed grasp; ring it with a moderate waving motion up and down three or four times, and replace in the n.m. position. The excursion of the waving is through a distance of about half a foot.

- (4) After appropriate observation, repeat the demonstration.
- (5) Observe again for an appropriate period and repeat the demonstration, always in the same manner, securing initial regard.

BELL RINGING

(4 weeks-24 weeks)

Preceding Situation. Rattle.

Conditions. The child lies supine on the canvas-covered frame or on the blotter of the crib platform. The crib panels are semi-raised.

Procedure. (1) Stand at the h.l.c. crib position and, without arousing the child's visual regard, take the silenced bell in the left hand, the intact bell in the right hand, holding each perpendicularly between index finger and thumb. (To prevent any premature sounding of the intact bell, hold the clapper with the index finger.)

(2) Retreat somewhat to the head of the crib and then bring both bells simultaneously forward about 2 inches above the platform until each bell is about 4 inches from the child's corresponding ear. Make every effort to keep the hands outside of the child's visual field.

(3) Coincidentally agitate both bells with a brief restricted motion. Muffle the bell immediately after it has sounded. Wait several seconds for response. Avoid too loud and sharp a sound and do not repeat the situation if the child shows a marked startle response.

(4) Exchange the bells and repeat, again waiting for delayed response.

(5) Exchange once more, making four trials in all.

(6) If the child does not keep his head in midposition, modify the procedure and bring the sounding bell to the available ear, taking added precaution to keep it out of the visual field.

CUBES: CONSECUTIVE

(12 weeks⁵-56 weeks)

Preceding Situation. Table top.

Conditions. The child is seated in the chair or on the platform. The table top is in place. If the hands are in a constrained position, they are

⁵ One cube only is presented at 12 weeks.

AN INTRODUCTION TO CHILD PSYCHOLOGY

BY

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freed. If the child is highly active, the examiner waits for a favorable moment for the presentation of the first cube.

Procedure: First Cube. (1) Hold a cube in left hand between index and thumb, drawing back the other fingers (to make them inconspicuous), and bring the cube circuitously below the farther margin of the table top in the median plane. Then raise the cube just above the level of the table top. Secure the child's visual regard by moving the cube slightly. If this regard is not readily elicited, tap the cube lightly against the table edge and, as soon as the child fixates on the cube, slowly advance it in the median plane and place it in the s.m. position. (Take approximately 2 seconds to move the cube from the far edge to the s.m. position.) Withdraw the hand promptly and as inconspicuously as possible.

(2) Leave the cube in this position for 9 seconds. If the child does not contact it before the 10th second, at that moment, advance the cube to the n.m. position. Leave the cube in this position for 10 seconds.

(3) If the child has not grasped the cube, place it in his left hand. If he has grasped the cube, it may be removed from his right hand, or it may be desirable to wait opportunistically for a favorable moment when he is retaining it in the left hand.

Second Cube. (4) While the child holds a cube in the left hand, promptly present the second cube in the manner already described for the first cube, advancing it also to the n.m. position if necessary. If the child drops the first cube before the second can be presented, the first cube should be replaced in the child's left hand and the second cube re-presented. Sometimes the activity of the left hand is such that it is necessary to make two or more attempts to secure grasp, and in exceptional cases the second cube must be presented without retention of the left hand cube.

Third Cube. (5) After an interval appropriate for observation, present the third cube in the manner already described for the first cube. At the moment of presentation, the child should be retaining a cube in either hand. With certain infants at certain age levels, this is impossible or impracticable. In such instances the examiner should not go to undue extremes to secure simultaneous retention of the cubes.

CUBES: MASSED

(16 weeks-56 weeks)

Preceding Situation. Consecutive cubes.

Conditions. At the conclusion of the consecutive cube situation, the child is permitted to hold one cube, which he retains until the massed cubes are ready for presentation.

Procedure. (1) Take the cardboard screen, hold it vertically and transversely in the f.m. position. Using the screen to conceal the maneuver, take 9 cubes and arrange them in a solid square in the midline of the f.m. position. Then take the cube which the child has retained and place it on top of the central cube in the mass formation.

(2) Advance with a fairly prompt maneuver to avoid actual seizure of the screen (by certain actively reaching infants). Advance both the screen and the cubes to the s.m. position and quickly withdraw the screen. If the child does not contact the cubes after a period of 10 seconds, put them approximately in the n.m. position.

(3) Take special note of all adaptive behavior, including spontaneous tower building.

TOWER BUILDING

(40 weeks-56 weeks)

Preceding Situation. Massed cubes.

Conditions. The examiner has removed all but four of the cubes.

Procedure. (1) Build with a moderately rapid maneuver a demonstration tower of two blocks in the f.m. position. Secure the child's visual regard while the demonstration is being made.

(2) Place one cube in the n.m. position and proffer the second cube to the child. By gesture and comment, request the child to build a tower. Repeat the request if necessary and even follow it by another demonstration. Attempt to secure responsive behavior. If no adaptive, responsive behavior is secured, demonstrate the tower in the s.m. position. Here again the demonstration may be repeated with gesture.

(3) At the later age levels, if the child has successfully built a tower of two, hand him a third, then a fourth, cube.

CUP

(12 weeks-36 weeks)

Preceding Situation. At 12 weeks, the pellet. At subsequent ages, the spoon.

Conditions. The child is seated in the chair or on the platform. The table top is in place.

Procedure. (1) Present the cup in the standard manner, inverted, with the handle in the median plane, pointing directly toward the child.

(2) Place the cup at the s.m. position.

(3) If the cup is not secured or is repeatedly brushed out of reach, advance the cup to the n.m. position in the same orientation. This maneuver must sometimes await a favorable moment to avoid contacting the infant's hands.

CUP AND CUBES

(32 weeks-56 weeks)

Preceding Situation. Cup and spoon.

Conditions. The child is seated in the chair or on the platform. The table top is in place.

Procedure. (1) Hold the upturned cup in the standard manner with the left hand, the handle directed toward the child.

(2) Grasp the collection of 10 cubes in the upturned palm of the right hand.

(3) Simultaneously advance both cup and cubes and place the cup to the left in the l.m. position and place the collection of cubes to the right in the r.m. position. For 20 seconds, or more, observe the resultant behavior.

CUP AND SPOON

(32 weeks-56 weeks)

Preceding Situation. Cup. After 36 weeks: Tower building.

Conditions. The child is seated in the chair or on the platform. The table top is in place.

Procedure. (1) Hold the upturned cup in the standard manner with the left hand, the handle directed toward the child. Hold the spoon with the right hand, handle directed toward the child. (The spoon is held at the junction of the bowl and handle with overhead pincer grasp.)

(2) Simultaneously advance the cup and the spoon in parallel lanes, the spoon at the right, the cup at the left, the cup 2 inches to the left of the midline, the spoon 3 inches to the right of the midline.

(3) Simultaneously place the cup and spoon in corresponding position on the transverse standard line.

(4) After the child has exploited the objects and the behavior becomes repetitious, remove the cup and spoon from his grasp and, with a quick maneuver, place the upturned cup in the f.m. position. Seize the spoon at the end of the handle between index finger and thumb. While the child is looking, thrust the spoon perpendicularly into the cup and rattle it with a moderate to-and-fro motion, striking the sides of the cup about 10 times in 5 seconds.

(5) Re-present both objects in the standard position as described in the cup and spoon situation. Observe the responsive behavior in the same manner.

(6) Make another demonstration of the spoon rattle. Follow this with a period of observation.

(7) If desirable, make a third demonstration, making special effort to secure the child's initial regard at the beginning of each demonstration.

CUP, SHOE, AND BOX

(48 weeks-56 weeks)

Preceding Situation. Formboard.

Conditions. The child is seated on the crib platform. The table top is in place.

Procedure. (1) While the child is watching, place the box at the farther right-hand corner of the table top, the cup at the left-hand corner, and the shoe transversely across the farther end of the median line.

(2) Taking a position at the foot of the crib, say to the child, "Where is the box?" "Where is the cup?" "Where is the shoe?" Repeat these questions, with variation of order, observing the child's reaching and ocular fixation to determine discriminative response.

(3) As a check, the position of any object on the table top may be interchanged with that of another object, or the object may be placed at random positions to determine consistency of response.

DANGLING RING

(4 weeks-28 weeks)

Preceding Situations. Supine, 4 weeks through 12 weeks. Bell ringing, 16 weeks through 28 weeks.

Conditions. Child is supine on either canvas frame or on platform. The examiner takes the normal position at the left, unless the dominating head position of the child causes the child to face the right.

Procedure. (Steps 1-5, as delineated below, apply only to examinations for the age levels prior to 12 weeks.) (1) Hold the dangling ring by the free end of the string between index and thumb of the left hand. With circuitous approach, bring the ring about 10 inches above the platform and slowly advance it toward the child.

(2) When the ring is immediately above the lower end of the sternum (zypheid), arrest the movement and allow the ring to dangle for about 5 seconds. The ring should be fairly steady. (If it is twirling, the examiner can easily stop the motion by momentarily interposing and then withdrawing his hand.)

(3) If no positive response occurs, move the ring into the line of vision, right or left, depending upon the head position. (The hand which the examiner uses to hold the string is determined by the head position.)

(4) Bring the ring within the near fixation field (usually about 10 inches from the child's eyes). In this position, bob the ring gently (a slight, slow, up-and-down motion) if necessary to encourage ocular response. When the infant fixates on the ring, move it slowly through an arc of approximately 180°, and then back again through the same arc with the same slow motion, keeping the radius of the arc constant. Use 5 seconds for each arc of 180°. Repeat this motion once or twice until characteristic or optimum responses have been observed.

(5) At a similar speed, move the ring from the eye level to 6 inches above the head, or farther if visual pursuit is secured. Then again, with the same speed, move the ring back to the eye level and advance it toward the infant's toes as long as visual pursuit is elicited. Repeat if necessary to secure optimum response.

(6) At 12 weeks and older age levels, hold the ring about 4 inches above the sternum for a whole minute if necessary in order to elicit incipient or

delayed prehensory responses. Bob the ring gently if necessary to evoke regard.

(7) If the infant does not grasp the ring but makes closure movements of any kind, steady the ring and orient it so as to favor effectual grasp.

(8) If in the closing-in movements he contacts the ring or hits it to one side, re-present the ring promptly and steady it to favor his grasp.

(9) If the child does not contact the ring, move it toward his left hand without actually inserting it into the palm.

(10) If he does not then grasp it, seize the ring between index and thumb and place it into his palm, prying the hand open if necessary to secure final grasp. Then release the ring.

FORMBOARD

(16 weeks-56 weeks)

Preceding Situations. Ring and string, 16-32 weeks; Paper and crayon, 36 weeks; Performance box, 40-56 weeks.

Conditions. The child is seated in the chair or on the crib platform. The table top is in place.

Procedure. (1) Present the board in the horizontal plane with the circular opening at the child's right, and the apex of the triangle pointing away from the child. Hold the board at the corner near the farther margin of the square and advance it beyond the n.m. position.

(2) Place on the table top so that the near edge of the formboard coincides with the near edge of the table top. Give the infant full opportunity to manipulate the board as he chooses.

(3) After an appropriate period of observation, restore the board in position and present the round block in the standard manner. Hold the block in the left hand edgewise between the index finger and thumb with the plane of the block coinciding with the median plane of the table top. Proffer the block to the infant, favoring, and if necessary encouraging, edgewise grasp by his preferred hand. To prevent the child from displacing or picking up the formboard at this time, the examiner's free hand may hold it in place.

(4) Note spontaneous behavior. Remove the block from the child's grasp and without delay or ceremony promptly slip it into the round hole, withdrawing the hand immediately. If, as occasionally occurs, the infant does not pursue the round block, lift the block once or twice from its position,

allowing it to fall back with mild report. This maneuver serves to direct attention to the block.

(5) Note spontaneous behavior and efforts at extraction of block. If in these efforts the board tends to slide far out of position, place hands on the board to keep it in normal position. Especially during the manipulation of the block in the hole, it is necessary to hold the formboard in position.

“GIVE IT TO ME”

(40 weeks-56 weeks)

Preceding Situation. Not specified.

Conditions. The child is seated in the chair on the crib platform. The table top is in place. The child is holding a ball or some toy which he has had opportunity to exploit. The toy chosen should not be one which at that moment has extreme interest for him.

Procedure. (1) Once or possibly twice in the course of the examination, at the conclusion of the massed cube situation, or at any favorable transitional period when the child is in possession of a cube, ball, or the tricolored rings, extend the hand, palm upward, and say, “Give it to me,” repeating once or twice. The examiner’s approach should be made somewhat informally to increase social rapport, but no further assistance is given.

(2) If the child extends the object over the examiner’s palm but does not release it, gently grasp the object and hold it, waiting for release and withdrawal by the child.

MIRROR

(40 weeks-56 weeks)

Preceding Situation. Ball play.

Conditions. The child is sitting on crib platform; right crib panel is completely raised; left one, lowered.

Procedure. (1) With somewhat playful approach, place the child squarely in front of the mirror while the curtain is still drawn before it.

(2) When he is looking forward toward the curtain, raise it promptly but not too abruptly. Remain in position ready to lend support to the child if he loses his balance, and observe inconspicuously his response to the mirror image.

(3) Allow the child full postural freedom, permitting him to stand if he desires.

PAPER AND CRAYON
(36 weeks-56 weeks)

Preceding Situation. Ring and string.

Conditions. The child is sitting on the crib platform. The table top is in place.

Procedure. (1) Hold the paper in the left hand at the farthermost edge from the child.

(2) Hold the crayon in the right hand, with the point directed away from the child.

(3) Present both paper and crayon in the standard manner in the horizontal plane and place them simultaneously in front of the child. The near edge of the paper is at and along the near edge of the table top. The long axis of the paper is parallel with the median line of the table top. The crayon lies near and parallel to the margin of the paper, at the child's right.

(4) If the child makes spontaneous marks on the paper, reverse the paper or give him a new sheet for the scribble demonstration. For this demonstration place the farther margin of the paper at and parallel to the farther margin of the table top. Take the end of the crayon with the right hand, hold it obliquely, and apply it transversely near the farther margin with repeated back and forth strokes, holding the forearm lifted so as not to obstruct the child's view. The demonstrated scribble marks are confined to a circumscribed area of the paper.

(5) Re-present paper and crayon simultaneously as before. Repeat this demonstration twice.

PELLET
(12 weeks-56 weeks)

Preceding Situations. Cube, 12 weeks; Cup, 16-28 weeks; Cup and cubes, 32-56 weeks.

Conditions. The child is seated in chair or on crib platform. The child's hands are dried, if necessary, by dusting them with talcum powder which has been sprinkled on a square of cellulose. To do this, place the child's hands pronately on the cellulose and, securing his acquiescence, pat and rub the palms a few times against the cellulose.

Procedure. (1) Hold the pellet with the convex surface downward between index and thumb of the left hand and advance it in the standard manner to the s.m. position.

(2) If the child brushes the pellet out of scope, or if in spite of precautions it clings to a moist hand, or if it is turned over, remove the pellet and re-present in the standard position.

(3) After 10 seconds if the child has not seized the pellet, advance it to the n.m. position. If visual fixation on the pellet is in doubt after presentation in the n.m. position, replace the pellet successively at varying distances to the right, to the left, and in front of the n.m. line in order to confirm the visual fixation.

PELLET AND BOTTLE

(32 weeks-56 weeks)

Preceding Situation. Cup and cubes, 32-56 weeks.

Conditions. Child is seated in chair or on crib platform.

Procedure. (1) Hold the bottle with the left hand between index and thumb, the mouth of the bottle upward.

(2) Grasp pellet with the right hand in the usual manner.

(3) Hold the bottle at the level of the child's plane of vision above the s.m. line.

(4) Drop the pellet into the bottle while the child is looking, being careful to hold the bottle in a manner to secure its fullest visibility for the child. After dropping the pellet, withdraw the right hand and proffer the bottle to the child.

(5) If he does not seize it at once, place the bottle in the n.m. position.

(6) After an appropriate period of observation, re-present the pellet and bottle as follows: Holding the bottle in the left hand, the pellet in the right, advance them simultaneously toward the child, starting in the standard manner from the far edge of the table top. Place the pellet in the r.s.m. position, the bottle in the l.s.m. position.

PERFORMANCE BOX

(40 weeks-56 weeks)

Preceding Situation. Paper and crayon.

Conditions. The child is seated on the crib platform. The table top is in place.

Procedure. (1) Hold the performance box by the handle and, taking care to avoid abrupt movements, bring it slowly above the table top and place it on

the table top, the lower edge parallel with the s.m. line, the small rectangular hole to the child's right.

(2) After an appropriate period of observation, take the rod in the left hand and bring it over the performance box in the median plane, obliquely directed toward the child. Release after he grasps it and observe subsequent spontaneous behavior.

(3) While he is still holding the rod, point with the right index to the center of the hole and say, "Put it in there," accompanying the words with tapping gesture but without actual insertion of the finger into the hole. Repeat this gesture once or twice.

(4) If the infant does not spontaneously insert and release the rod into the box, take the rod from him and, holding it at the end between index and thumb of the right hand, insert the rod slowly and fully in view of the infant and drop it so that it falls with report within the performance box.

(5) Tilt the performance box and remove the rod and proffer it to the child as before.

(6) The demonstration is omitted altogether if the child in the first instance accomplishes full insertion of the rod. In that case, remove the rod and restore it to the child. Repeat the gesture to elicit insertion.

(7) After insertion, again remove the rod. Restore it to the child and repeat the gesture, securing if possible three consecutive performances.

POSTURAL ADJUSTMENT

(32 weeks-56 weeks)

Preceding Situations. Prone, 32 weeks; Mirror, 36-56 weeks.

Conditions. Crib platform is bare; right side panel is raised; left side panel is semi-raised unless otherwise specified.

Procedure. (1) SUPINE TO PRONE. To determine the capacity of the infant to roll from supine to prone position, place him athwart the crib with his feet directed toward the examiner. Bring the lure (bells or rattle) into the child's view and drop it at his right side within a few inches of his costal margin, but beyond his reach. If no postural adjustment follows, pick up the lure, shake it, and replace it, waiting 30 seconds for a possible delayed response. If no response occurs, repeat this procedure at the infant's left.

(2) SUPINE TO SITTING. No lure may be necessary to induce this behavior. Simply place the child supine and step forward. If he does not attempt to sit,

a lure held in a position favorable for manipulation from a sitting position should be used.

(3) PRONE TO SITTING. If the child's capacities and maturity so indicate, seize a favorable opportunity to induce a change from the prone to the sitting position. This must be accomplished somewhat informally; if while prone, the child is given a lure to play with, he may more or less spontaneously assume the sitting position.

(4) SITTING; PIVOTING. While the child is sitting on the platform, place the lure to the left or right and somewhat to the rear of the infant to induce pivoting, both clockwise and counterclockwise. If the child pivots, withdraw the lure in an arc to keep it just out of his reach.

(5) SITTING TO PRONE. (a) While the infant is sitting, place the lure on the platform in front of him to induce reaching. As he reaches forward, withdraw the lure slightly by stages to elicit forward progression and to demonstrate any ability to shift from the sitting to the prone position.

(b) If the infant is able to attain a prone position, use the lure again to elicit crawling or creeping behavior. If the child's abilities warrant it, advance the lure to secure progression to the foot of the crib and then to the head of the crib.

(6) SITTING TO STANDING. Place the child in the sitting position, confronting the side rail. With the assistance of the lure, encourage him to pull himself independently to the standing position. His ability to assume the standing posture independently without physical leverage or support may be observed incidentally or determined informally.

(7) WALKING. If the child stands effectively with support, remove his hands from the side rail and turn him so that he confronts the distant end of the crib. Lend the support of one or two hands in accordance with his requirements and, affording this support, attempt to elicit stepping movements and forward progression. If he walks forward with very slight support, the support may be momentarily but cautiously withdrawn to determine independent walking.

The Use of Lures. Frequently the infant will display his postural behavior when no lure at all is used. Indeed, in certain initial stages of development, the lure may be an actual hindrance to progress. For instance: In rolling, the direct reaching for the lure placed at the infant's side brings the arms into a position which makes rolling unusually difficult; the arms are very much in the way.

Contrariwise, the lure may sometimes induce behavior which is beyond the child's voluntary control. For example: If the lure is placed to the side but in line with the head, reaching for the lure in that position brings the arms into a favorable position and the infant may inadvertently roll to prone. The position of the lure is, therefore, important and the record of behavior should include notations concerning the lure.

It is advisable to employ various lures. When one lure loses its motivating power, another one may be substituted. The mother or examiner may also serve to initiate the postural changes. When possible, the lure should be put in place rather than held, because a free lure generally has more attraction for the infant than one held by the examiner. To be most effective, a lure should be placed *just beyond* the infant's reach. If it is too far away, he apparently may despair of getting it. Judgment must be exercised about permitting the child to secure the lure.

PRONE

(4 weeks-56 weeks)

Preceding Situation. Standing.

Conditions. Right side panel of crib is raised; left, lowered. Crib pad and blotter are in place.

Procedure. Observations of prone behavior are secured in different ways, depending upon the capacities which the infant has displayed in the just preceding behavior situations.

(1) While the infant is being held in the supported standing position, cautiously shift the supporting hands and hold the child in ventral suspension, with head directed toward the examiner's left. (Lengthwise of the crib, head facing the foot of the crib.)

(2) The method of holding the infant will vary with the size and postural control of the infant. Hold the young infant with one hand on either side of the thorax. Observe the head posture very briefly while keeping him in horizontal ventral suspension.

(3) Lower him slowly to the prone position, noting the body attitude. Adjust the child's arms so that they will not be constrained when the prone position is established. If the arms lie in full extension along the trunk, lift the thorax free from the platform with the left hand and flex the arms of the infant, then re-establish the prone attitude. If the child's head is on the

side and is not lifted, very gently turn it to the midline, placing one hand on either side of the head to accomplish the passive rotation.

(4) Dangle the sleigh bells (or tri-colored rings) in front of the infant at a distance favorable for vision. When visual fixation is secured, slowly raise the bells to elicit maximum lifting of the infant's head

(5) Again using the bells as a lure, dangle them on the platform to elicit reaching and keep them just beyond the child's reach to induce progression reactions. Should he pivot, move the bells right or left accordingly. If he does not pivot spontaneously, attempt to induce pivoting by slowly advancing the bells on the platform by stages, keeping them just beyond the child's reach. This procedure is first attempted in the clockwise direction and then in the counterclockwise direction, but is not unduly prolonged. Occasionally the child may be rewarded by a brief retention of the lure.

RATTLE

(4 weeks-28 weeks)

Preceding Situations. Dangling ring, 4-16 weeks; Supine, 16-28 weeks.

Conditions. The infant is supine, lying on canvas frame or crib platform. Right side panel of the crib is semi-raised.

NOTE: The procedure is first specified for the 4-12 weeks old infant. At older ages, omit sections 5, 6, and 7.

Procedure. (1) Hold the rattle in the left hand, between index and thumb, at the junction of bowl and handle.

(2) Bring the rattle into the median plane at the foot of the crib about 10 inches above the platform. Holding the rattle horizontal with the handle pointing obliquely downward toward the foot of the crib, advance it slowly in the median plane and arrest the movement above the lower end of the sternum. Wait 5 seconds to note the response.

(3) If the infant fixates on the rattle, hold it there 5 additional seconds. If he does not respond, gently but briefly activate the rattle by rolling the handle between the thumb and forefinger.

(4) If he does not then regard the rattle, bring it into the visual field, either right or left, depending upon the head position. Secure the visual regard, immobilize the rattle, and hold it for 5 seconds.

(5) Now move the rattle toward the face-hand,⁶ touching the dorsum of the

⁶ See glossary for definition of "face-hand."

digits with the rattle handle. If the hand is open or presently opens, insert the rattle handle into the palm.

(6) If the hand remains fisted, gently pry the fingers back and insert the rattle handle. Observe the responses after grasping for approximately 1 minute or until the rattle is dropped.

(7) Take the rattle again, removing it if necessary by gently prying the fingers open. Secure regard in the manner previously described. Bring the rattle at once into the visual field as previously described, but this time move the rattle slowly toward the occiput hand. Touch the dorsum of the digits or insert into the palm as indicated before. Similarly observe the behavior for approximately 1 minute or until the infant drops the rattle.

(8) At 12 weeks and at subsequent age levels, prolong the time during which the rattle is held immobile above the sternum on the initial presentation. After the responses have been noted, advance the rattle directly to the left hand. Hold it within 2 inches of the left hand to elicit spontaneous grasp.

(9) If this does not occur, contact the palmar surface with the handle, or if necessary, insert fully into the child's palm.

(10) Observe the manipulation of the rattle for approximately 3 minutes. If the rattle drops out of the child's hand, note any visual or manual pursuit. If the child disregards the loss, and if the three-minute period has not terminated, replace the rattle in his hand.

RING AND STRING

(28 weeks-56 weeks)

Preceding Situation. Bell.

Conditions. Child is seated in the chair or on crib platform. Table top is in place.

Procedure. (1) Take the ring in the left hand, holding it between index and thumb at a point directly opposite the point where the string is attached.

(2) Take the string at the free end between index and thumb of the right hand. Hold both string and ring in the horizontal plane, keeping the string moderately taut.

(3) Simultaneously advance both ring and string. Place the ring slightly in advance of the f.m. position and the end of the string in the r.s.m. position.

(4) Release hold of the ring and string promptly and simultaneously, being careful to move the string as little as possible in the maneuver.

(5) If by chance the string proves to be beyond the child's reach or if he brushes it beyond his scope, re-present the ring and string in the manner described.

(6) If the child's attention wanders from the situation, partially lift and tap the ring on the table top.

(7) Re-present once again if necessary. If after three opportunities the string is not secured, re-present once more, placing the string so that it extends along the median line with the end slightly in advance of the s.m. region.

RING, STRING, AND BELL

(32 weeks-56 weeks)

Preceding Situation. Ring and string.

Conditions. Child is seated in the chair or on crib platform. Table top is in place.

Procedure. (1) Present the ring, string, and bell in the manner described for the ring and string, this time placing the bell on the table within the ring. This presentation may be accomplished with one maneuver by holding the ring between the medius and index, and the bell between index and thumb of the left hand.

(2) Immediately after placement, seize the bell, holding it perpendicularly 2 inches above the table surface. Ring it briefly and replace it. Execute this maneuver with dispatch.

(3) In some cases, while ringing the bell with the left hand, it may be necessary with the right gently to restrain the child from creeping toward the objects.

SITTING

(4 weeks-56 weeks)

Preceding Situations. Bell ringing, 4-16 weeks; Dangling ring, 16-28. Thereafter, when instituted, it is the initial situation.

Conditions. Child is lying supine on crib canvas support or on crib platform.

(a) PULLED TO SITTING

(4 weeks-28 weeks)

Procedure. (1) By gentle handling, without actually lifting the child, shift his position 90° counterclockwise so that he lies athwart the crib, looking

toward the examiner. Accomplish this change in position carefully, lending adequate support and assistance with both hands, in order to make the maneuver comfortable and gradual for the child.

(2) Stand at the left side of the crib confronting the child. Take time to establish favorable rapport. In order to preserve this rapport, it may be advisable to take hold of the child's hands and pull his arms gently two or three times as though to raise him to the sitting position without actually doing so. This preliminary tension, if repeated two or three times, will serve to establish postural responsiveness and will produce favorable conditions for later reactions. Abrupt raising of the child to the sitting position should be strictly avoided.

(3) Insert the thumb of the left hand into the palm of the child's right hand, and the thumb of the right hand into the palm of the child's left hand, circling the child's forearm with the fingers. Exert a gentle but firm grasp on the forearm, pull the child gently forward in the median plane, carefully steady-ing him. The amount of pressure and angulation of the child's arms must be determined cautiously and empirically. In general, the line of traction will be about 45° from the horizontal.

(4) If necessary to exert a counter pressure, have the soles of the child's feet press against the slightly raised side panel. Exert the traction gradually and pull the child slowly to the sitting position. If the head lags extremely, do not complete the traction to the vertical. When the head sinks to the plat-form, momentarily hold both of the child's hands with the left hand and bring the right hand under the child's occiput for support, sustaining the support until the sitting position has been attained. If the infant shows a strong extensor reaction, lower him to the supine position and gradually repeat the pulling traction unless it proves impractical to overcome his extensor reaction. Al-ways guard against sudden slipping or falling.

(b) SUPPORTED AND FREE SITTING

(5) After the child is in the sitting position, hold both his hands with the left hand and bring the right hand against his thorax, thumb in front and fingers supporting his back. Then release the left hand to a similar position. As suggested above, this transfer is made warily, one hand at a time; otherwise the infant may extend suddenly during the brief moment when supported by the one hand only. The examiner's hands must not exert too much upward pressure under the armpits.

(6) Now lift the child several inches and rotate him so that he confronts the foot end of the crib. Lower him, shifting the supporting hands. Relax the right hand and bring it against his back. Still using the hands to steady the position, gradually relax the support and note the curvature of the back and head posture as the support is withdrawn. If the child leans forward, keep the hand under his chest to offer immediate support. Permit this passive sitting posture for a moment, but do not prolong the situation if the infant shows any intolerance whatsoever.

(7) If the infant is incapable of passive sitting and yet sits well when supported at the back, hold both of his hands and gradually lower them to a normal position so they may aid in supporting him.

(8) Sitting without support may be tested on the platform if necessary. The examiner cautiously withdraws his hands and observes the sitting balance for a moment or more.

SITTING IN CHAIR

(12 weeks-40 weeks)

Preceding Situation. Sitting.

Conditions. The examination chair is used only if the child does not show adequate sitting control, or in very exceptional cases whose general motor activity cannot otherwise be controlled. (This may be as late as 40 weeks.) The chair is on the crib platform. The supporting band is attached to the right side of the chair. The double or single band is used, according to the child's postural requirements.

Procedure. (1) Place the child in the chair and fasten the band.

(2) Adjust the back of the chair to secure optimal head station and general body control.

SPOON

(16 weeks-36 weeks)

Preceding Situation. Cubes massed.

Conditions. The child is sitting in the examination chair. The table top is in place.

Procedure. Seize the spoon at the junction of the bowl and handle, holding it between the index finger and thumb, hand in the supine attitude. With the concavity of the spoon facing upward and the handle directed toward the child, advance the spoon in the horizontal plane and place it in the standard position

with the junction of bowl and handle at the s.m. point. Observe both pre-hensory and manipulatory behavior.

STAIRCASE

(40 weeks-56 weeks)

Preceding Situation. Advanced posture and locomotion.

Conditions. The staircase is placed in position with the right panel of the crib down and the left panel raised. The top step of the staircase is against the right panel, the steps extending at right angles to the crib. All objects are removed from the platform.

Procedure. (1) Lift the child and place his feet in front of the first tread. Hold the child at the thorax and allow him to bend forward so that his hands come to rest pronately on the second tread. Lend support if necessary. If the child shows only meager capacity to sustain this position independently, do not continue the observation. If, however, his postural control is sufficiently advanced, wait as much as 20 seconds to observe response.

(2) Place the lure (rattle, bells, rings) on the second or third tread but beyond the infant's reach in order to entice him to mount the treads. If there is no postural response, gently seize the child's right foot, flex the leg at the knee and place the foot squarely on the first tread. Again wait as much as 20 seconds if necessary to note any climbing response. If there is no spontaneous response, encourage response by lifting and replacing the lure. Then take the left foot in the manner described and place it on the second tread. Use discretion in determining whether to proceed with the situation. Occasionally it proves effective to use a secondary lure placed on a more advanced tread or on the platform of the crib. If active climbing is induced, the lure may be withdrawn when the infant is about to secure it and placed at a higher level.

(3) If the infant scales the staircase, observe his spontaneous postural adjustments and by all means finally give him the lure as a reward.

STANDING

(4 weeks-56 weeks)

Preceding Situations. Sitting, 4-8 weeks; Cup, 12 weeks; Formboard, 16-32 or 36 weeks; Cup-shoe-box, 32 or 36-56 weeks.

Conditions. The crib platform is bare; the right side panel is raised; the left panel is lowered.

Procedure. (1) Hold the child above the crib platform with a hand on either side of the thorax. The child confronts the examiner. Lower him to the standing position, supporting him with well distributed grasp under each axilla.

(2) At first support the entire weight of the child and allow the soles of the feet merely to contact the platform.

(3) If the child manifests any leg extension, gradually relax the support and determine how much weight the child will himself support. If initially he manifests no extension, lower his weight gradually to observe possible later extension.

(4) If the child supports his full weight, completely but cautiously relax support to ascertain whether he exhibits full control of balance. If he wavers, grasp either forearm and lend partial support to observe the degree of his control.

(5) For further determination of balance, raise the side panel and allow him to seize it. Provide support graduated to his capacity.

(6) If the postural control is adequate, encourage him to release one hand.

(7) Standing before the panel of the crib confronting the child, offer a lure to stimulate cruising either right or left. Place the lure on the side rail within almost accessible distance. Then gradually withdraw it to stimulate locomotion.

(8) To determine the child's capacity to lower himself from the standing position, dangle the lure within his view and place it on the platform several inches to the side of either his left or right foot.

SUPINE

(4 weeks-28 weeks)

Preceding Situation. From 4 through 28 weeks, the supine situation is the very first, unless the child resents this posture. In that case the situation is instituted at the end of the examination.

Conditions. 4-8 weeks: The crib side panels are lowered; the canvas frame rests on the crib platform. 12-28 weeks: Crib side panels are semi-raised; pad and blotter are in place on the crib platform.

Procedure. (1) Place the infant on his back, lengthwise of the crib platform. Special arrangements for the surface on which he lies have been detailed in the general statement concerning the conduct of the examination.

(2) Take the h.l.c. station and observe the course of the child's behavior for a period of 2 to 3 minutes. Curtail this period if necessary and do not prolong the observation if the child shows any intolerance of the position.

(3) At the end of the situation in which the child is supine, his capacity to roll from supine to prone may be investigated if the child's behavior or the mother's report warrants it. Follow the procedure designated under *Postural Adjustment*, page 55.

TABLE TOP

(12 weeks-56 weeks)

Preceding Situation. Sitting in chair, 12-40 weeks; Initial situation, 40-56 weeks.

Conditions. The child may be in the chair or seated on the platform. The side panels of the crib are adjusted at a height level with the child's elbows so that the flexed forearm can be readily brought onto the table top when it is put into position. The child and the chair (if used) are adjusted so that the table top edge when in place will be within an inch or two of the child's abdomen.

Procedure. (1) Holding the table top in a horizontal plane, bring it slowly into place on the side panel railings.

(2) If necessary readjust the panels so that the table top is at the proper height.

§ 5. PRECAUTIONS IN EXAMINATION AND MANAGEMENT

Throughout the behavior observations it is essential that the examiner be watchful of the child's safety and comfort. Particular points of danger are as follows:

Spoon Situation. When the infant brings the bowl of the spoon to his mouth, especially at the teething ages, he may "bite" on it with such strength that its edge, pressing on his gums, causes pain and possibly crying.

Sound-Producing Toys. There are a few infants unusually sensitive to sound. The sharp report of the hand bell or the rattle of the spoon in the cup, or even the noise made by their own activity, may startle them so that they cry.

Supine Situation. Rolling sometimes occurs with such suddenness that it is disturbing to the infant.

Pulled to Sitting. If there is lack of arm resistance, or if the head lag is very marked, the situation should not be completely instituted. Instead, the child should be raised to the sitting posture by lifting him at the back. Sudden extension of the child while being pulled should be anticipated as it is occasionally encountered.

Sitting in the Chair. An infant should not be placed in the examining chair unless his head control is adequate. The chair is so constructed that it will not tip with ordinary activity. However, at the older age levels if the infant leans to the side and grabs the side rail of the crib, he can upset the chair.

Sitting. At the younger ages before head control is established, the examiner should be ready to support the infant's head. When the child can completely maintain his balance in the sitting posture for prolonged periods, he may surprise the examiner by throwing himself backward with suddenness. The examiner's left hand should always be in readiness to prevent this. Falling sideward is usually less unexpected, but it should nevertheless be guarded against.

Prone. When placing the child prone at the ages when it is necessary to adjust the child's arms, care must be taken not to force the arms into position, but rather to put them into place before the child contacts the platform.

General Postural Situations. Throughout these situations the examiner's hand must be held near or lightly touching the child to prevent any fall which might injure him.

Sudden Approach of the Examiner. Elsewhere the manner in which the examiner first establishes rapport with the child is described. Friendly relations established with him before his nap do not necessarily persist after he wakes. The infant does not react favorably to a brusque advance or a stare. His sensitiveness must be respected.

Abrupt Separation from the Mother. Although the child may accept the examiner with friendliness, if his mother retreats quickly after this adjustment, the rapport between infant and examiner may be disrupted as soon as he notices his mother's disappearance. This can usually be avoided by prolonging the mother's presence somewhat beyond the point when he has apparently accepted the situation.

The Physical Comfort of the Infant. The infant usually cries when he is uncomfortable and sometimes when this response has been brought forth it is difficult to terminate it by attention to his needs. It is, therefore, desirable

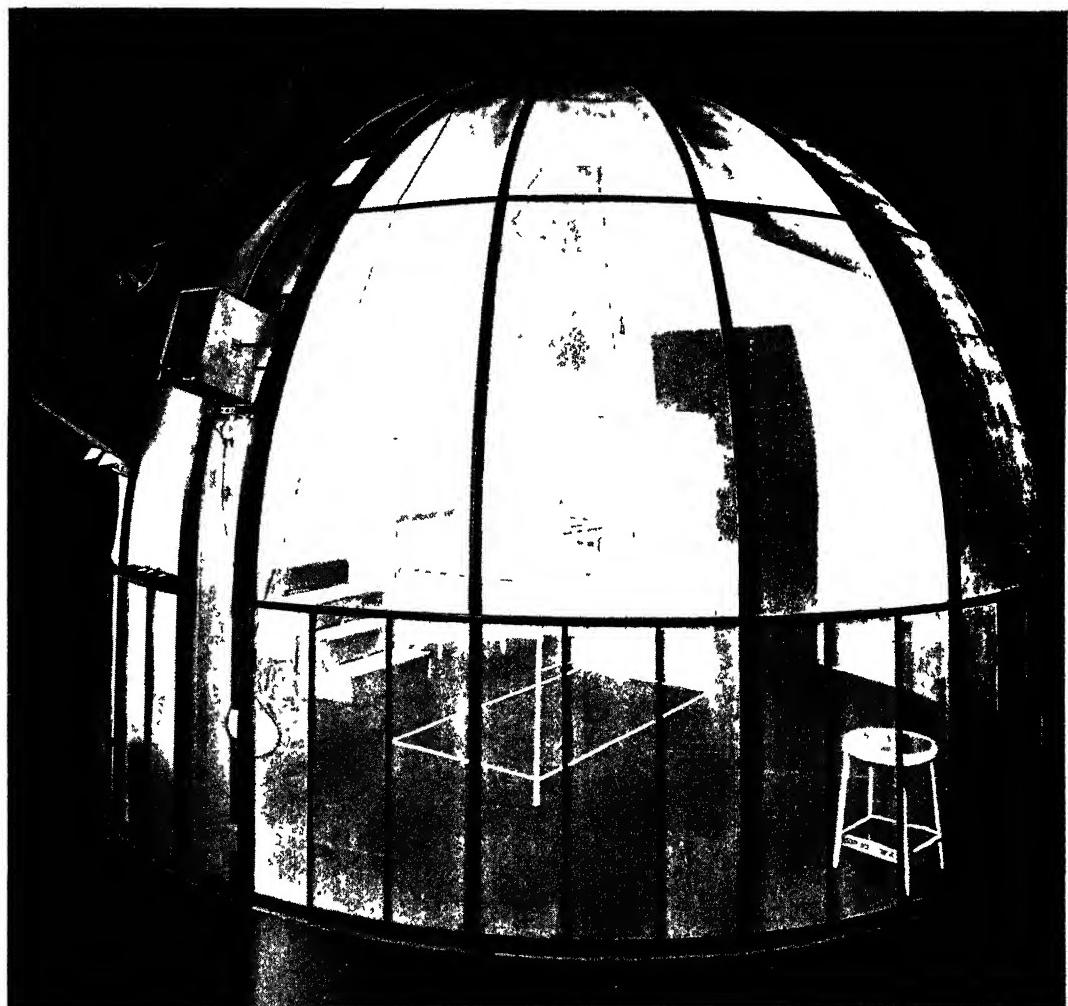


FIGURE 4 — PHOTOGRAPHIC DOME



FIGURE 5 — NORMATIVE OBSERVATION CRIB



FIGURE 6 — NORMATIVE CRIB AND STAIRCASE

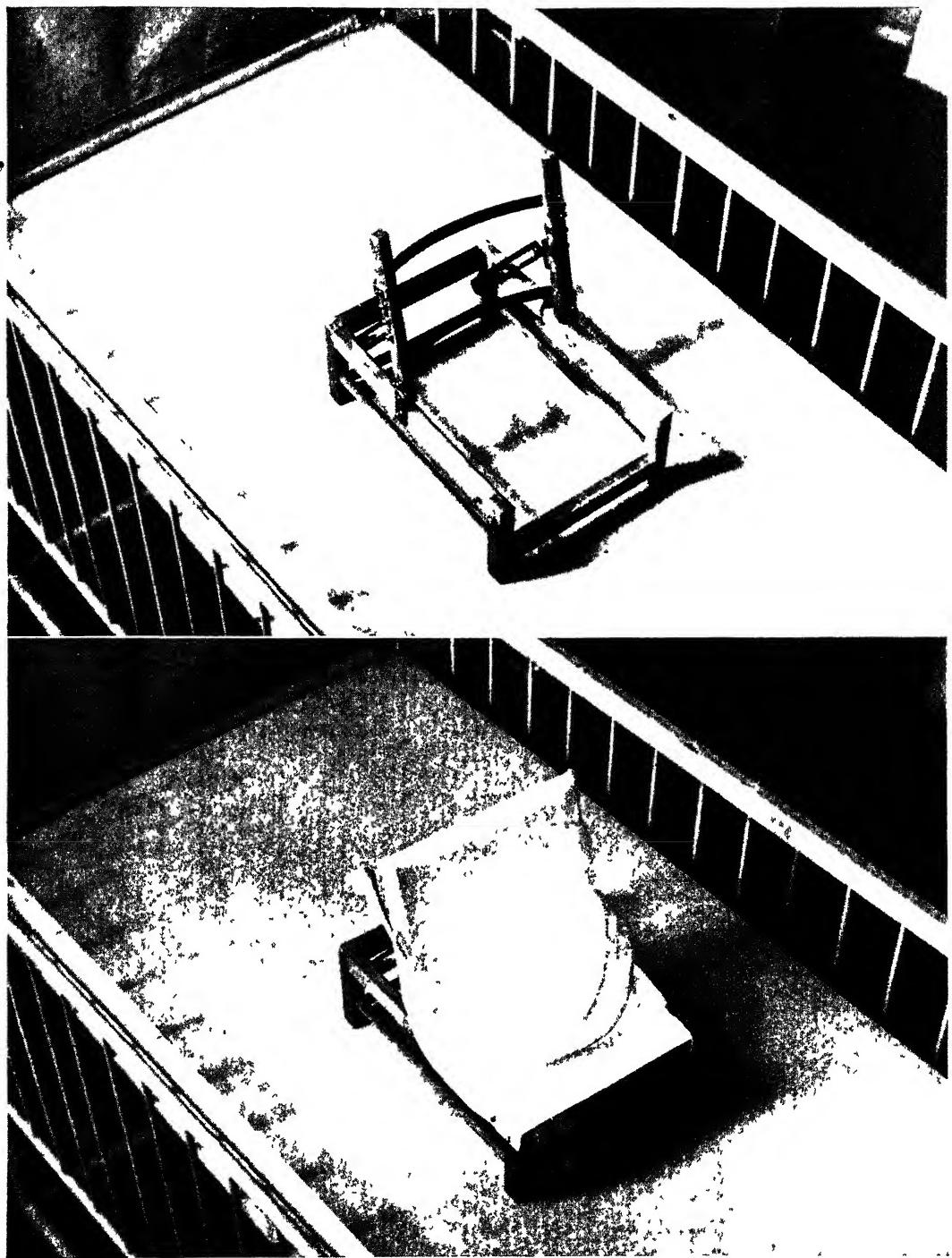


FIGURE 7—EXAMINING CHAIR WITH REMOVABLE CANVAS SEAT AND BELT

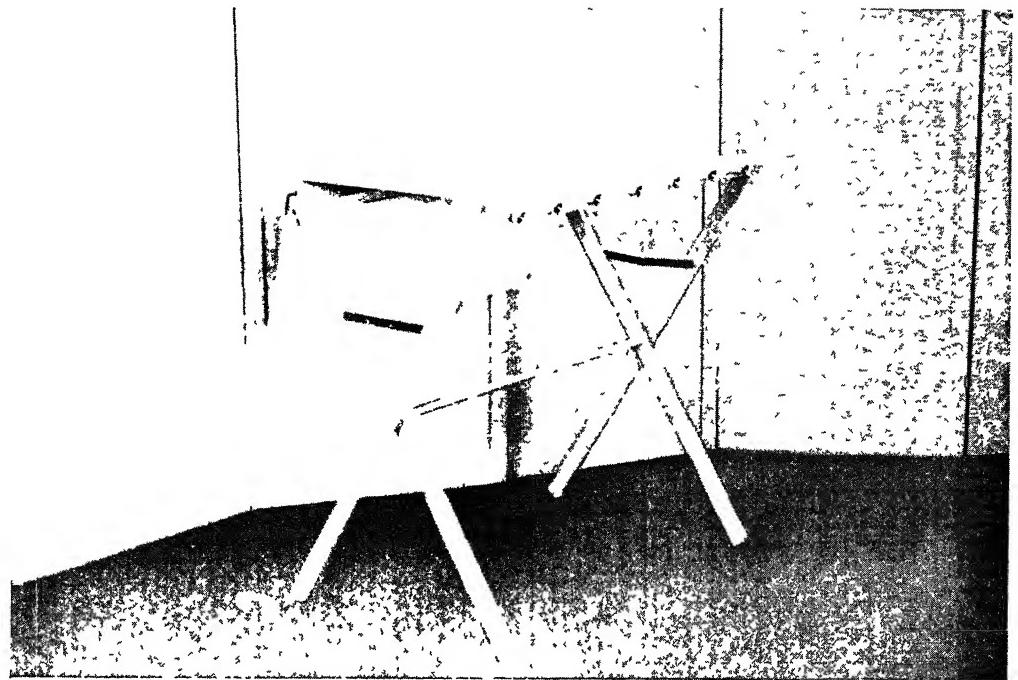


FIGURE 8 — PORTABLE EXAMINING TABLE

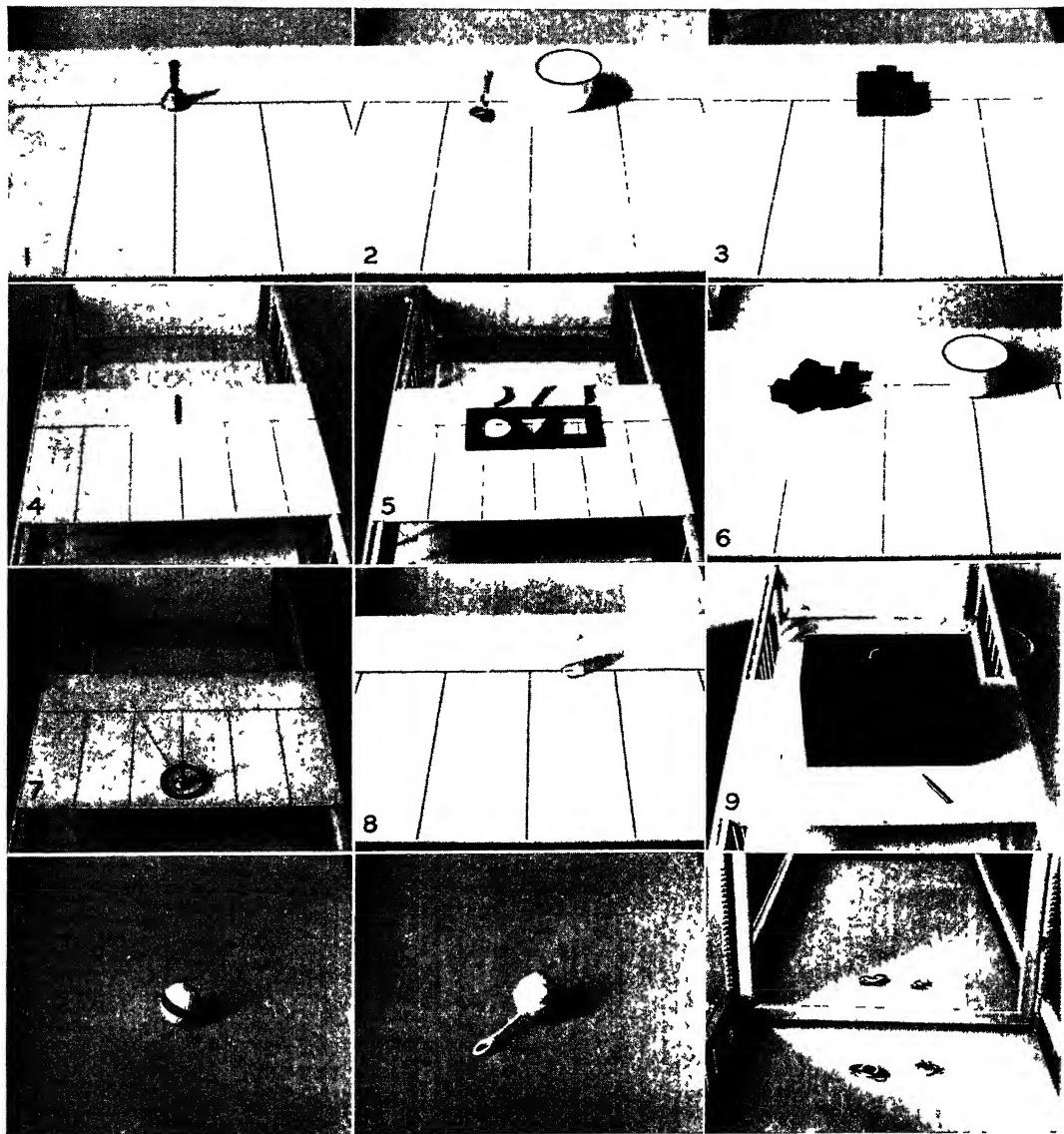


FIGURE 9—SPECIMENS OF EXAMINATION MATERIALS

- | | |
|--|---|
| 1. Bell in standard median position | 8. Pellet and bottle |
| 2. Cup and spoon in standard median position | 9. Performance box and rod photographed against
the foot end of the crib |
| 3. Massed cubes | 10. Ball |
| 4. Paper and crayon | 11. Rattle |
| 5. Formboard and three blocks | 12. Tricolored rings, cat bells, and mirror |
| 6. Cup and cubes | |
| 7. Ring, string, and bell | |

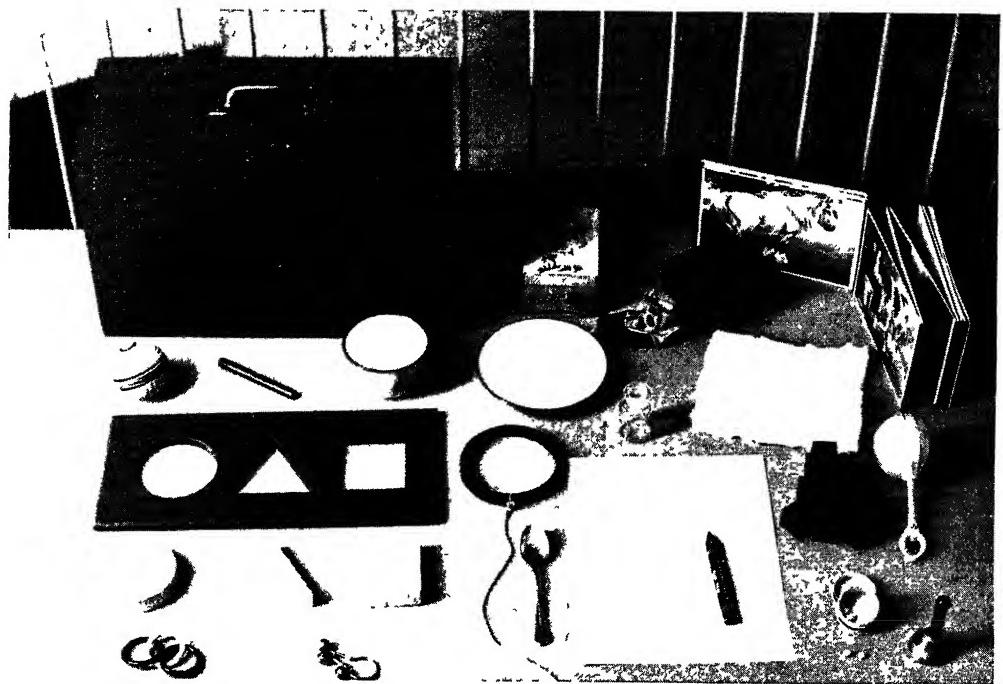


FIGURE 10 — DEVELOPMENTAL TEST MATERIALS

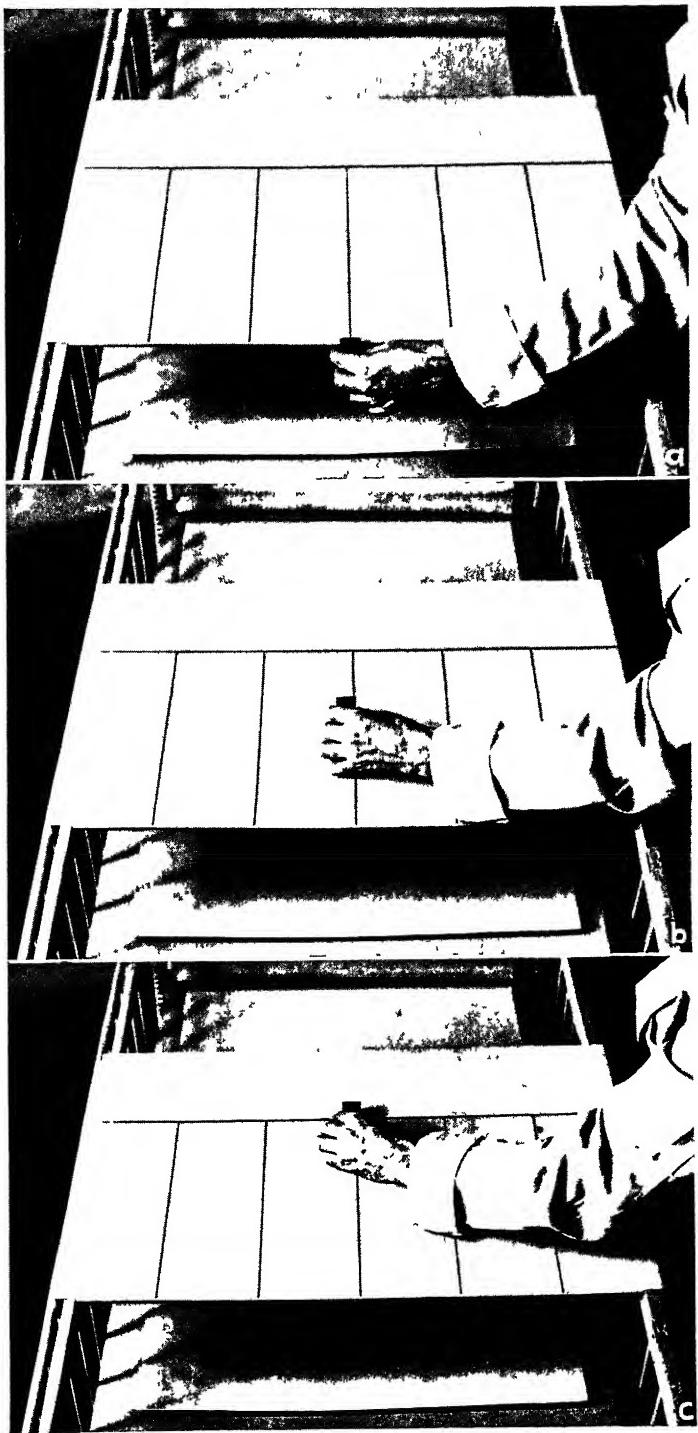


FIGURE 11 — TABLE TOP AND PRESENTATION OF SINGLE CUBE

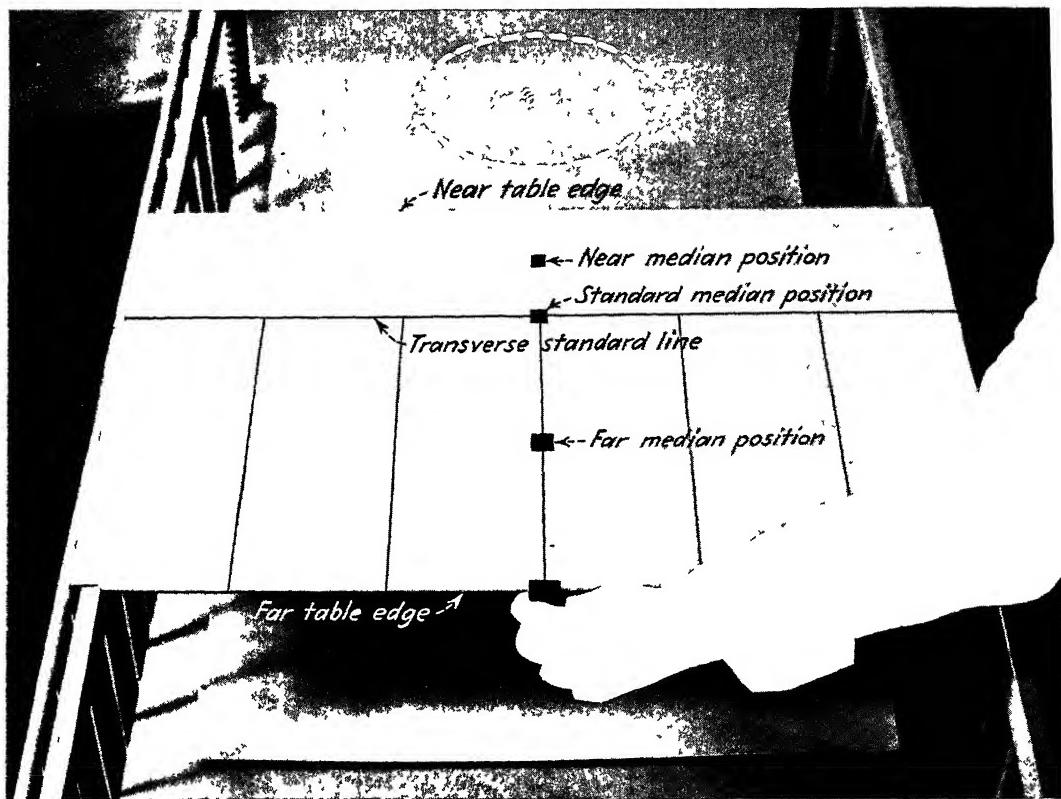


FIGURE 12 — LOCATION POINTS OF EXAMINATION TABLE

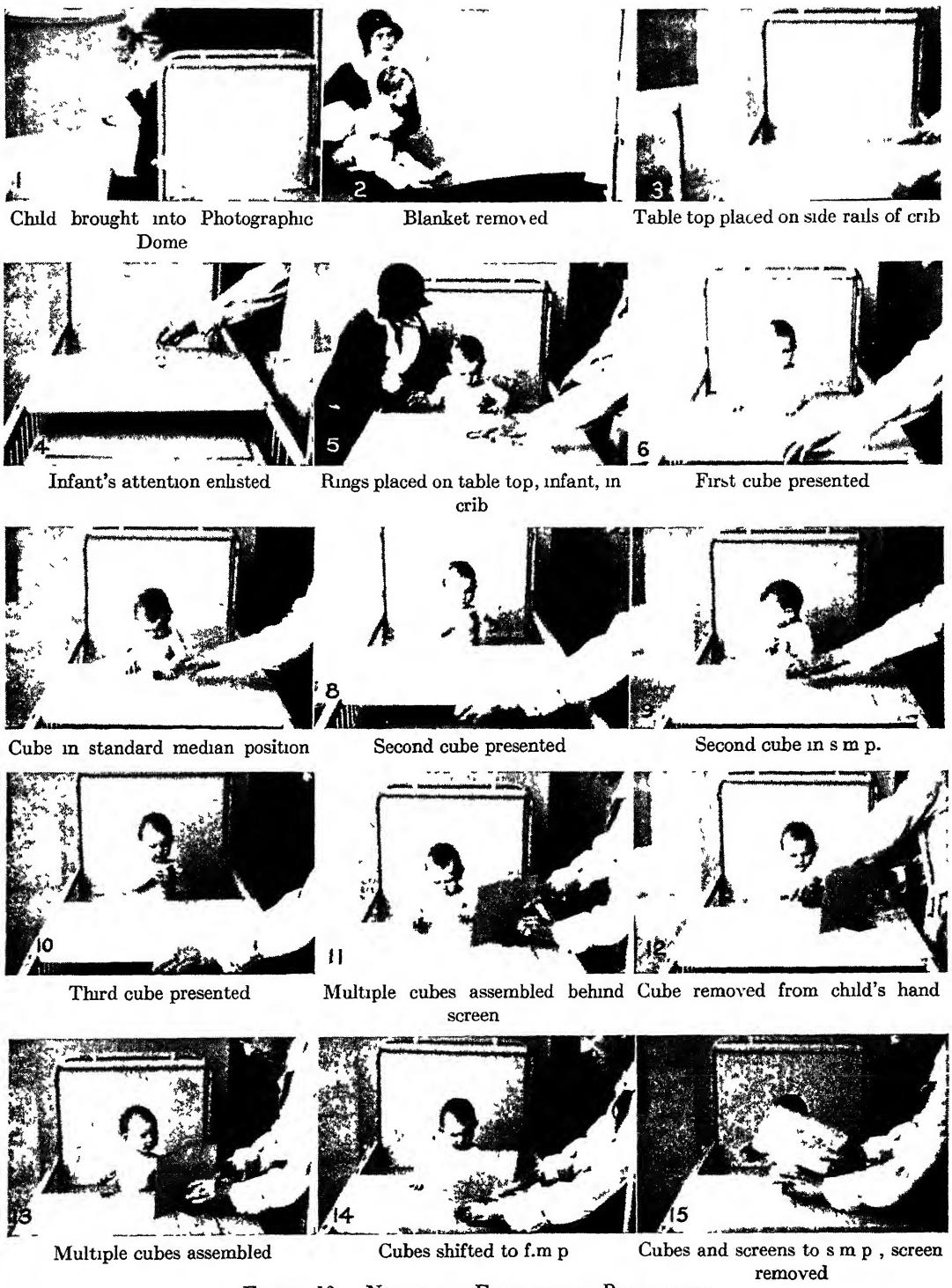


FIGURE 13 — NORMATIVE EXAMINATION PROCEDURES

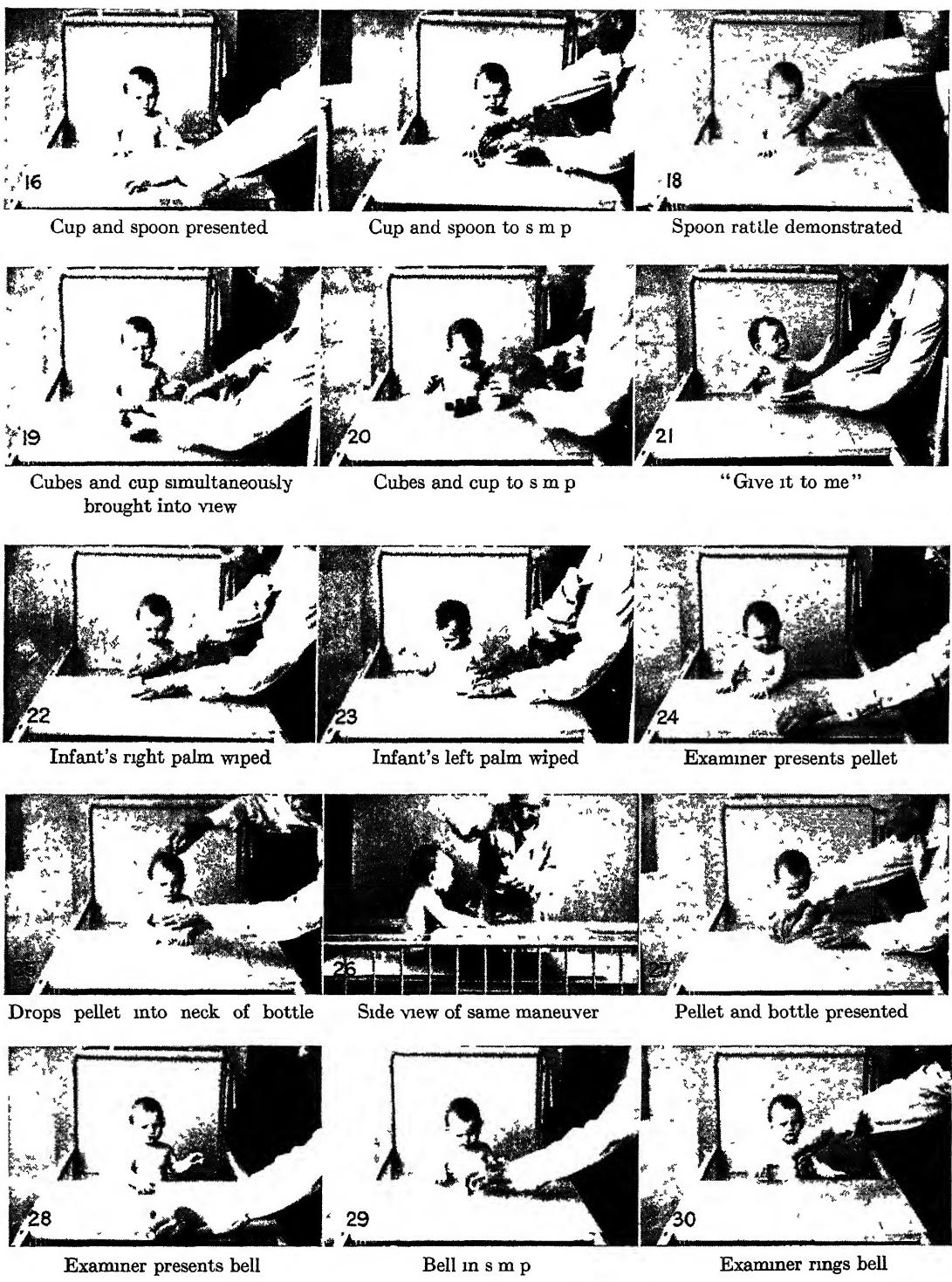


FIGURE 14 — NORMATIVE EXAMINATION PROCEDURES



FIGURE 15 — NORMATIVE EXAMINATION PROCEDURES



FIGURE 16 — NORMATIVE EXAMINATION PROCEDURES



FIGURE 17 — NORMATIVE EXAMINATION PROCEDURES



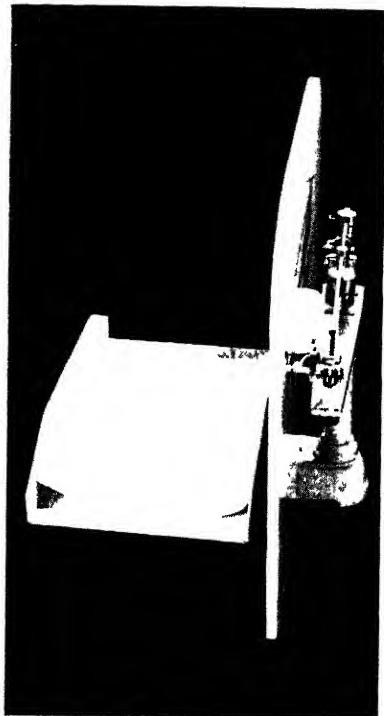
The Longitudinal Measurements

1. The distance from the soles of the feet to the vertex was obtained just before the infant lowered his chin to look at the assistant 2 The examiner is measuring the distance from the soles of the feet to the suprasternal notch Note the position of the assistant's thumb and fingers 3 The crease over the pubis serves as a landmark for measuring the distance from the soles to the upper border of the pubic symphysis

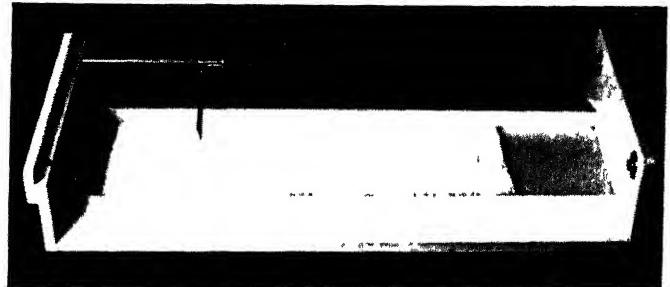
Diameters and Circumferences

4. The examiner holds the infant's arms in position as she makes the biacromial measurements
5. The assistant may restrain the infant's feet somewhat when the bircristal diameter is measured.
6. This infant was unusually quiet during head measurements

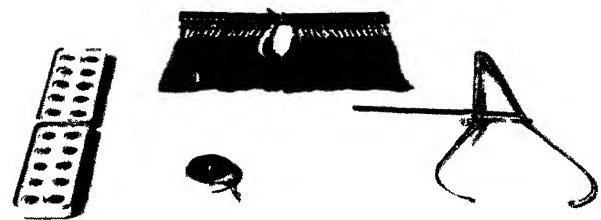
FIGURE 18 — THE ANTHROPOMETRIC EXAMINATION



Weighing scales, fitted with screen to
protect balance beam from
infant's grasp



Measuring board with anthropometer in position



Glass eye scale

Artificial hair scale
Steel tape

Spreading calipers

FIGURE 19 — INSTRUMENTS USED IN ANTHROPOMETRIC EXAMINATION

to anticipate discomfort. Infants are particularly disturbed when cold, tired, and hungry. The temperature of the examining room should therefore be watched. Signs of fatigue such as flushing or slight fretfulness should be regarded and feeding should not be delayed beyond the accustomed time.

Removal of Test Toys. Infants who are unusually tenacious of their toys will sometimes be emotionally disturbed by the removal of a toy which is intriguing to them. It is helpful in such cases to resort to some ruse. At certain ages the examiner's hand may become the diverting object; at others, a supplementary object may be used, especially if there is a necessary intermission in the examination. In other cases it may be desirable to delay removing the cherished toy, as it will be relinquished more readily when the next object is presented. Such departures from defined procedure are preferable to an emotional disturbance.

Sanitation. It is assumed that the usual sanitary precautions will be observed. The test materials are sterilized after each examination; a clean canvas covering for the chair and frame and a new blotter are supplied for each examination and they are changed during the examination if soiled or wet by the infant. The examiner is garbed in a clean smock; the hands are washed immediately prior to each session. If the examiner is suffering from a respiratory infection, even in its incipient stages, he should not make the examination. In case of emergency it would be permissible to use a gauze mask. This mask, however, might be disturbing to the infant and is too suggestive to the mother of the possibilities of infection to be used except in unavoidable instances.

CHAPTER V

THE BEHAVIOR RECORDS

AFTER characteristic behavior has been elicited, there remains the all important task of determining what responses have been made and of preserving them for study. There is, of course, no single accurate method of recording, equally appropriate or practicable for all purposes. The more specific and limited the investigation, the more precise should be the instruments for recording. The present study was essentially an exploratory, though systematic, survey. There was no attempt to verify tentative hypotheses. The field of exploration was extensive and therefore selective recording devices restricted to certain phases were not warranted. Within broad limits it was desirable to make the survey comprehensive.

An inclusive, adaptable, simple method of approach was indicated. It was natural that the examiner, who of necessity was in close contact with the child, should also be the observer. It would have taxed the examiner less if a second individual, behind the one-way-vision screen, had served in the capacity of observer. This arrangement was tried but discarded. Such a procedure would have required an additional trained assistant who could not in any event have combined the functions of recording and observing. Moreover, his greater remoteness from the child would have made certain observations difficult or even impossible.

Several methods of obtaining an accurate record were tried. The checking method, which has been found serviceable in other investigations, was attempted but was discarded for the reasons which follow. When all of the possible responses are listed by this method, the recording sheet becomes too cumbersome for convenient identification of any one item. One activity frequently excludes many others so that minus checks are frequently redundant. The impossibility of foreseeing all of the possible responses prior to the investigation was apparent after a few cases had been examined. The checks offered no means of reviewing and re-evaluating the behavior after a lapse of time. Indeed mere check marks would have made it virtually impossible to reconstruct a behavior pattern in its organic integrity.

The method finally adopted was found to be admirably suited to the study. The examiner dictated a running account of the behavior to a stenographer who, in addition to recording the notes, kept a marginal time record, was alert to inadvertent errors in dictation, and kept notes of obvious incidental happenings. The dictated record gave a dynamic and vivid picture of the flow of activity which made possible an analysis of the integrated behavior. It may be thought that this method would tax beyond capacity the examiner's powers of observation, but for each specific situation he had in mind certain behaviors which were consistently observed and reported. Any additional responses which the examiner noted were entered into the record. While specifically directing his focus of attention, the examiner also exercised alertness to marginal activities which were reported. The immediacy of the dictation of the behavior to a stenographer enhanced considerably the reliability of the basic data.

§ 1. THE TREATMENT OF THE BEHAVIOR RECORDS

The records from the 524 examinations present a formidable mass of data. Care has been taken in every instance to avoid purely statistical analysis. Only those items were finally tabulated which had been consistently made the subject of observation and report at all examinations. The persons engaged in the actual tabulations were made fully acquainted with the manner in which the facts were originally gathered. At all stages the analysis was under direction and supervision.

Originally it was the intention to secure separate statistics for the sexes. However, as the analysis of behavior proceeded, there seemed to be no outstanding, consistent difference between the male and the female infants. We, therefore, continued to keep the tabulations separate but derived percentages on the combined number of cases, leaving for a later study a comparison of the behavior of the sexes. Combination of the data is probably least justified in the case of gross motor behavior where boy infants are likely to be more precocious than girl infants. Doubtless there are other instances in which anatomical and physiological sex differences impose their influence on behavior phenomena. In the case of bodily measurements and correlated findings, where there was an indubitable sex difference, separate statistics were calculated.

Prior to the analysis of the protocols, the research assistants were instructed in the behavior examination procedures which were used in securing

the data. Cinema records were also demonstrated to familiarize these assistants with the character of the varied behavior items and of the investigation itself. The data were then subjected to detailed analysis, with due regard to both consistent and variable factors.

The actual instructions which were given to the research workers follow:

1. Read over the Procedure for Presentation of Material for the situation in question.
2. Study a motion picture record of one child for the age levels being analyzed.
3. Read the dictated record for five or six cases at each age level, jotting down items of behavior noted.
4. Organize the items of behavior under headings such as: regard, activity with, distracted by, etc.
5. List the items on a special form as per sample. Use separate sheets for boys and girls.
6. Read the dictated records and check the behavior in columns opposite the proper items, using a separate column for each child and indicating the case number at the top of each column.
7. Use symbols as listed for checking behavior with respect to the following categories:

Marked frequent behavior
Activity definitely present
Activity definitely present, but only occasionally displayed
Activity definitely absent
Activity not mentioned
Activity not mentioned, but its absence implied
Activity not mentioned, but its presence implied
Activity of very poor quality, slow, accidental, etc.
Activity of quality below the average
Activity of quality above the average
Activity of very superior quality

Other symbols may be devised for special purposes as they are needed. When this is done, keep a careful record of their meaning on the back of the sheet.

8. When behavior has been checked for the same child for a situation at two consecutive age levels, compare the two. Retaining the same symbols, mark over with red pencil on the older age sheet the check marks which

indicate behavior not present the previous month. If some behavior is not present which was present earlier, recheck those items in the same way with green pencil. For example:

Dangling ring — 16 weeks girls	20 weeks girls
Number 6	Number 6
regard	regard
stares	stares
inspects	inspects
approach	approach
closes in	closes in

9. If check marks for the same child for a situation at consecutive age levels are identical or very nearly identical, reread the records to be sure that no errors have been made in checking.

(The records for the age levels 4-12 weeks were all checked by the person who made the examinations.)

As the work progressed, special questions concerning the treatment of data arose. For instance, if a child at one time maintained his head erect and later in the examination the head was seen to sag, should the optimum response be checked or should both items be recorded? It was decided that the latter procedure would be followed. If a situation was reinstated and new behavior items were consequently observed, both the items in the original behavior and the items in the subsequent behavior were indicated, but with a differential designation. Naturally in some cases it seemed desirable to group one, two, or even three items which were closely related in order to bring out certain behavior trends.

What should be the method for calculating the per cent of cases showing a given behavior? Three alternatives were possible: (1) Base the percentages on the total number of infants examined at any age level, regardless of whether or not they were given the situations. This obviously would not be a desirable procedure because the resulting figures would be too low. (2) Base the percentages on those cases for whom we had a definite report for the given item of behavior. This would have changed the basis for the percentages of practically every item and would have weighted positive behavior. Percentages on this basis would, therefore, be too high. In general it could safely be assumed that, if behavior was not detailed or implied, it was not observed. (3) Base

the percentages on those cases in which there was *any* item of behavior reported for the situation to be analyzed. This last method seemed the most satisfactory and logical one to pursue.

As stated before, emphasis was placed upon positive behavior. If an infant engages in one form of activity, this frequently precludes other forms of behavior, or definitely implies that other forms of behavior must have taken place. For instance, if the supine infant grasps his foot, item *Feet remain on the platform* can safely be assumed to be negative. If, on the other hand, the infant grasps an object on the table, it is obvious that he has contacted it; and furthermore it can be assumed unless the examiner explicitly has stated otherwise that he first regarded it. With only a few specified exceptions, therefore, all of the percentages for any given situation have been based on the number of cases observed in that situation. For analytic purposes it was occasionally desirable to base the percentages on those infants who demonstrated a certain kind of activity. For example, an item reading *If approaches, approaches with delay* is based on the number of cases who approached an object. Whenever this has been done, the item is preceded by the conjunction "if." Naturally these percentages must be differently regarded.

It is significant that the dictated records were sufficiently objective so that they could be subjected to this impersonal analysis. The work of the assistants was carefully checked at all stages in order to insure against any errors. Because an infant's behavior was checked for any item which he might be displaying at any time during the situation, the percentages may total more than 100. For instance, *Approaches with one hand* and *Approaches with both hands* may both be above 50 per cent at a given age level.

As a rule the children subjected to a specific situation were not especially selected from the group but if they were, the percentages for that age level were not used. The one exception to this is in the stair climbing situation. The examiner refrained from reinstating this situation at the 40 or 44 weeks age level if the child obviously had insufficient motor capacity.

When the behavior for a situation had been completely itemized and checked for each infant for each age level, the percentage of infants displaying each item having been determined, the findings were scrutinized and only those items of behavior which displayed the most significant growth changes were retained. More than half the items for each situation were discarded. Usually a further analysis of the material was necessary to illuminate and to

verify the findings, or to investigate some behavior the significance of which had not been anticipated at the time of the first listing of the items.

§ 2. THE RELIABILITY OF THE BEHAVIOR DATA

The reliability of our data cannot be discussed in general terms, but only in relation to the separate aspects of the study. The variability of the infant's behavior must be first considered. No check was made to determine whether, if the total examination were reinstated either on the same or the following day, the infant would display the same items of behavior. The impossibility of reinstating the same situation has been pointed out by many writers. To check comparability of behavior in reinstated situations would indicate merely the consistency of the infant's performance. The infant is growing and learning rapidly and it is very possible that behavior on the following day will be slightly modified.¹ However, we have evidence that the modification is only slight. Repeatedly infants examined on one day were brought back to the Clinic on the succeeding day for a photographic record. Except in very unusual circumstances involving affective or physical factors, such infants displayed essentially the behavior patterns of the previous day.

Careful regard was paid to chronological age. It was our practice to permit only 2 days' deviation from the assigned age; and only very few exceptions were made, as indicated by Table 17 on page 33. The rapidity of mental growth in infancy makes a close adherence to age important for developmental research. In this respect our data are reliable. They are representative of the abilities of the normative infants at the assigned chronological ages.

That the behavior displayed at the Clinic was not unlike the behavior displayed at home was ascertained by interview with the parent. We have reason to believe that the examining conditions stimulated rather than inhibited activity. Frequently mothers had not yet observed the behavior at home and were surprised at their infants' accomplishments. Even in the field of locomotion this was true. A few infants actually took their first steps at the Clinic. Several others, to the amazement of their mothers, made their first demonstration of climbing ability on the staircase used in the behavior examination.

The motivating factors were probably not equal for all the children, but every effort was made to adjust the child adequately to his surroundings and to obtain from him his optimum behavior. If he showed evidence of fatigue

¹ Thompson, Helen: "The Growth and Significance of Daily Variations in Infant Behavior." *Journ. Genet. Psychol.*, 1932, 40, 16-36.

during the examination, the examination was discontinued and he was fed or given a chance to sleep.

The adjustment to the examination was always made gradually so that the infant was not startled by sudden changes. An initial brief interview with the mother served to introduce the examiner gradually. From the infant's point of view the whole conduct of the examination was leisurely. All of these factors contributed to the validity of the infant's behavior and the reliability of the data.

Dictated Report. Because of the limitations of the examiner's attention span and speed of verbalization, it cannot be assumed that all behavior responses were reported. In fact the examiner deliberately restricted the observations to focal phases, with secondary attention to marginal behavior manifestations. These phases shifted with the course of the episode. Accordingly, when an object was presented, the infant's initial regard was first noted; then the infant's approach movements; then the grasp and disposal. Only the salient features of the behavior events could be reported. A high degree of consistency in the observation of these salient features of behavior was obtained by having only one examiner for the examinations at 4, 6, 8, and 12 weeks and only two examiners at the older ages.

Stenographic errors were reduced to a minimum by employing only adequately trained persons. Moreover, the recorder was able to view the whole examination through the one-way-vision screen and could therefore follow the dictation with understanding. Errors in the examiner's report, such as confusing right and left, were obvious.

A comparison of the dictated record with an inspection of cinema records threw additional light on the question of reliability. The comparison could not be reduced to statistics partly because the cinema films of necessity covered only portions of the entire behavior sequence. Minute analysis of the cinema records will always furnish more precise and comprehensive data for a given run of behavior; but comparisons with the typewritten records show that the salient features of behavior were correctly reported in dictation.

Each item at each age level has its own reliability and to make a statistical summarization of the individual reliabilities would be impractical. However, at the 16 weeks level, two sets of independently gathered data afford a good indication of the reliability of the study as a whole. At that age two different groups of children, A and B, were separately examined by two different examiners. The results are comparatively tabulated on the following page.

THE BEHAVIOR RECORDS

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TABLE 18

COMPARATIVE TABLE SHOWING THE INCIDENCE OF SELECTED BEHAVIOR ITEMS*
As Determined by Two Examiners Observing two Different Groups of 16 weeks old Infants, but Using
Essentially Identical Methods

SITUATION: PRONE BEHAVIOR

ITEM	PERCENTAGE OCCURRENCE DETERMINED BY		ITEM	PERCENTAGE OCCURRENCE DETERMINED BY	
	A (16 Cases)	B (27 Cases)		A (16 Cases)	B (27 Cases)
Pr 3 . .	100	83	Pr 23	81	83
4 . .	18	31	24	12	18
5 . .	82	70	25	0	26
6 . .	100	100	27	50	82
7 . .	95	93	28	36	10
8 . .	56	52	33	17	11
10 . .	75	64	34	11	9
11 . .	83	91	35	5	4
13 . .	21	29	36	22	7
16 . .	24	7	38	33	11
17 . .	5	11	39	5	4
18 . .	22	36	40	5	0
19 . .	33	39			
20 . .	39	59			
21 . .	82	74			

SITUATION RATTLE BEHAVIOR

ITEM	PERCENTAGE OCCURRENCE DETERMINED BY		ITEM	PERCENTAGE OCCURRENCE DETERMINED BY	
	A (16 Cases)	B (27 Cases)		A (16 Cases)	B (27 Cases)
Ra 3 . .	37	33	Ra 28	18	13
8 . .	69	68	29	15	15
9 . .	31	57	30	17	31
10 . .	62	64	31	7	20
11 . .	18	7	36	36	38
12 . .	38	23	37	21	42
13 . .	43	65	38	64	56
14 . .	0	14	39	0	23
15 . .	36	50	41	36	26
18 . .	87	77	42	29	3
20 . .	20	28	45	64	63
22 . .	43	55	46	21	20
24 . .	39	25	48	12	18
27 . .	27	19	49	0	14
			52	31	28
			53	18	25

* The items related to the prone situation and the rattle situation are designated by numbers corresponding to the listings of §21, page 123 and of §22, page 125.

DIFFERENCE IN PERCENTAGE	PER CENT OF ITEMS SHOWING DIFFERENCE	
	Prone (28 Items)	Rattle (30 Items)
3% or less	21	23
6-3 %	22	10
9-6 %	11	14
12-9 %	7	10
15-12 %	14	26
25-15 %	14	10

In the prone situation the percentage differences of items indicating the part of the body on which the child rests are large. These items were not always specifically dictated but the infant's position was inferred from the description of the behavior. The items were, however, retained because the trends expressed are valid and significant.

In the A group the rattle was presented after the dangling ring and was placed in first one hand and then the other. In the B group it was presented as the first situation and was placed only in the left hand. This difference in procedure may have introduced some behavior differences reflected in the comparative percentages.

Considering the small number of cases and the possible sources of error in the techniques of study and of selection of subjects, an agreement within 10 per cent in approximately half of the items listed represents an acceptable degree of accuracy.

§ 3. THE INTERVIEW PROCEDURES

By means of interviews we secured valuable supplementary information concerning the home behavior and developmental background of the children observed at the Clinic. It was recognized that, in the familiar and secure confines of his home, the infant might display significant patterns of behavior not observable during a brief visit at the Clinic. This would be notably true with respect to vocalization and language responses and habits incidentally acquired in connection with the domestic routine.

Moreover, it was necessary to obtain additional facts concerning home conditions and the history of the parents and the child. Preliminary inquiries in this respect were a necessary part of the procedure in the selection of a group of homes relatively homogeneous with respect to social and economic status (see p. 18). Interviews were made both in connection with the home visits and with the Clinic visits. These interviews embraced the following fields: home record, health history of the parents, birth and developmental history, behavior day, home behavior.

The Home Environment. The Home Record, as well as the baby's Behavior Day, was secured by a home visitor when the parents were introduced to our project. An interested and co-operative attitude on the part of the parents was of course important. It was advantageous to have a tactful and skillful assistant to secure the preliminary information. The assistant could assume

a more detached relationship to the questions than the examiner, and this impersonal, objective relationship helped to break down any barriers. If there was any hesitancy in regard to supplying information on the first visit, the questions were deferred until a later time when a relationship of full confidence had been built up.

The Behavior Day. The Behavior Day Record was designed to furnish information concerning the child's sleeping and eating habits, his diet, and the routine of his everyday life. The relation of these factors to his behavior is apparent. The facts themselves are important and they bear a relation to his behavior characteristics. It is also of interest to know the practices of the average home with respect to bottle, breast, and supplementary feeding, frequency of feedings, provisions for the infant's sleep and play. These practices, however, reflect current practice as well as the requirements of the infant.

There was no resistance to the home visitor's questions concerning the child's behavior day. We repeatedly assured the mother that we were not trying to find out whether her child was normal but were investigating the daily life of normal infants. By similar methods of interview, the examiner usually secured an additional behavior day record when the child was brought to the Clinic.

On subsequent visits to the Clinic, the behavior day record was always obtained by the examiner or an assistant at the time of the Clinic visit. It was usually the first subject of the interview, the introductory question being, "What time does the baby wake up in the morning?" If the mother mentioned a fairly late hour, the examiner said, "Does he wake up before that?" The mother's response was recorded and the examiner then said, "And what happens then?" If the mother did not mention the time, the examiner said, "At what time?" The same question was repeated until a record of the day was secured. If the mother omitted to mention feedings or nap, or failed to be specific in her reply, the examiner resorted to further questioning; but as a rule the entire day could be reviewed with no more specific question than, "And what then?" In some cases, if the mother had difficulty in reporting the child's day because of its irregularity, the examiner asked, "What usually happens?" If an occurrence were equally likely to happen or not to happen, that fact was recorded. If the mother could not give a general schedule, she was asked to detail the routine of yesterday. She was further asked to esti-

mate the kinds and amounts of food given at each meal, the method of feeding, and the child's appetite.

The amount of time spent in sleeping and waking, and the number of sleeping-waking periods are undoubtedly associated with certain aspects of adaptive behavior and personality type. For biogenetic studies it will be important to investigate these relations even though the time determinations are only approximate.

Home Behavior. While securing the behavior day record it was natural for the mother to speak of the child's play behavior. Thus she incidentally supplied information in regard to the infant's home behavior. Inquiries were made with respect to the special fields of gross motor, fine motor, language and adaptive behavior, play activities, and habit formation. There was no series of set questions. The interview was shaped to ascertain each child's behavior characteristics and any individual traits which had not come under our own observations. The parent's report was not necessarily accepted as it was given. If the examiner suspected an overestimate of behavior, or if the report was not specific, the examiner questioned further to arrive at a just interpretation.

History. The history records were usually secured at an opportune time during the first visit to the Clinic. At subsequent visits the inquiry was limited to the health of the child during the interval. The mother's account of the child's birth was checked and supplemented by the physician's record, whenever possible.

Our informal contact with the parent during transportation to and from the Clinic frequently revealed intimate details of the home and its relationships which added materially to an understanding and appreciation of the child's environment. The consecutive contacts with the mother built up friendly attitudes and fostered confidences which yielded valuable data for biogenetic study.

The Analysis of Reported Behavior. The Behavior Day Record and the Home Behavior Record secured by interview were tabulated and analyzed in the same manner as the data derived from the behavior examinations. For instance, reported vocalizations, feeding and toilet habits, social play, and play opportunities, as shown by toys and place of play, were itemized and checked to determine percentage incidences for each age level. This itemization facilitated a comparison with observed behavior. Sleeping periods and

sleep duration were summated in continuous series rather than in a dichotomous "yes" and "no" classification. The data were accordingly treated like the physical measurements; averages and standard deviations were determined for each age level.

To increase the reliability of reported observations, other investigators have required that records be kept as the happenings occur. We found such a requirement impracticable. The person of average socio-economic status avoids the written record even in such simple matters as checking a card to confirm an appointment by mail. Household duties, combined with the attention which an infant demands, tax the mother's energies quite completely. In the present study we relied upon verbal report.

Verbal report is subject to special errors when, as in this instance, observations are untrained and more or less undirected. In addition, errors of memory are involved. The most objective items of behavior are the most reliably reported. Mothers err not so much in actual report as in interpretation of the behavior observed. The interview makes it possible to correct for errors of interpretation which are not controlled by the inflexible form of a printed questionnaire.

Sleep and Wakefulness. The Behavior Day Record was studied to determine the amount of time in twenty-four hours a child was awake, the length of his longest waking period, and the number of sleeping periods in the twenty-four hour day. In those instances when a child was awakened for a feeding and the length of the period awake could not be estimated with confidence, it was considered to be 15 minutes. A child was assumed to be asleep 10 minutes after being put to bed when it was reported that he went right to sleep. If a child was reported to sleep "off and on" for a certain period, one sleeping and one waking period were recorded and the child was credited with being half the time awake and half the time asleep. If occasional naps during a waking period were reported, the child was credited with two or three sleeping periods of 15 minutes, according to the length of the period. The waking periods, therefore, do not include all of the small periods of wakefulness but only those in which the child is definitely awake for a known length of time. The length of the longest waking period offered no problem. It usually came during the day and the mother's report in this respect was fairly definite.

The factors which determine the relative sleepfulness and wakefulness of an infant are many; undoubtedly the most important of these are his physio-

logical needs. Illness in its acute stages usually produces wakefulness and during periods of recuperation sleep is indulged in more than normally. The child's environment is obviously important; a cool, darkened room is conducive to sleep, while a warm, sunny one is not. It has been claimed that the infant in sleep is less disturbed than the adult by sound, whereas to cold, pain, and light he is more sensitive. The presence of an individual or any other stimulating factor in the surroundings prolongs the waking period. It is significant, however, that in a given environment the infant himself determines to a certain extent his own sleeping and waking habits. As he matures he sleeps less, his periods of sleep being longer and less frequent. Conversely, he is awake more and for longer periods. The changes which we see occurring in his first year are more largely a reflection of advancing maturity than of parental management. The accuracy of the behavior day report must be discussed before deviations in growth changes are evaluated.

Concerning the behavior day we must remember that an infant in the home necessitates certain scheduled activities; the clock must be watched for feeding time so that the bottles will be warmed or the meal made ready. The mother or other householder in charge usually has in mind a schedule which she follows and modifies as the needs of the child change. The behavior day is therefore a very objective and conscious routine.

People differ considerably in their ability to estimate time; some mothers are definitely time conscious and others are less so. Undoubtedly some records are much more reliable than others. Mothers tend to overestimate the time that the child is asleep, because if he lies quietly in his bed, he will not attract attention and will be presumed to be asleep. This is particularly true of the night sleep. Mothers tend to underestimate the time that the child spends sleeping during the day because it is only during the sleeping periods that they are free for other activities. Reported behavior in general tends to indicate more sleep than is actually observed. Comparison of our findings with those of others suggests that such indeed is the case.

The number of actual sleeping periods is also probably greater than that reported. An infant's waking up and dozing back to sleep are undoubtedly frequently overlooked. While this invalidates seriously the absolute value of the norms, the error from age to age is a more or less constant one and can be corrected.

It will be remembered that two behavior days records were obtained for

the initial examination: one at the home, the other at the Clinic. Identity of these records is not necessarily an indication of veracity of report; nevertheless, comparison of the two sets of records furnishes some indication of their reliability. No gross discrepancies appeared. Statistically to check this reliability, however, would not give us a true indication of the value of our data. It was the second behavior day, obtained at the Clinic, which was used for study.

Mothers are likely to magnify a single incident of fortuitous behavior. Our method of interview greatly reduced this source of error. For other reasons home behavior reported by the mother should be regarded as an under-statement of the child's actual performance. The mother may not be with the infant during his reactive play time, for the child is often left alone in his crib or carriage, or he is left with an older brother or sister. The mother may not have observed the particular behavior in question. The mothers became more detailed and positive in their reports with their repeated Clinic visits.

A partial check on the value of the parent's report is available in a few instances where an item of reported behavior was also subjected to our own observations. A list of comparative percentage values for a few items follow.

TABLE 19
COMPARISON OF PERCENTAGES OF BEHAVIOR ITEMS AS REPORTED BY
MOTHER (R) AND AS OBSERVED BY EXAMINER (O)

	AGE IN WEEKS					
	4	6	8	12	16	
Moves headward (supine)	r o	38 7	35 4	37 0	50 0	67 4
Moves footward (supine)	r o	12 0	17 0	30 0	27 0	24 0
Pivots (supine)	r o	4 7	21 0	22 0	27 0	60 29
Lifts head (supine)	r o	0 0	0 0	4 0	31 0	36 24
Hands together (supine)	r o	0 16	0 4	11 11	42 28	72 47
Hand play (supine)	r o	0 0	0 0	4 0	23 8	52 27
Finger fanning (supine)	r o	0 0	0 0	4 4	19 16	20 0
Regards hands (supine, dangling ring and rattle) . . o	r o	0 0	3 7	15 18	73 42	80 36

It must not be thought that the discrepancies in the above percentages represent overinterpretation on the part of the parent. Our observation covers only a comparatively brief period. We would not expect the incidence of headward and footward displacement to take place as frequently in a short time span as in a longer interval. Also during the Clinic observation spontaneous bodily activity may be slightly depressed due to the child's attention to his new surroundings and stimulating toy.

Every item of reported behavior, except "hands together," shows a higher incidence than the corresponding item of observed behavior, nevertheless it is believed that the report is a modest appraisal of the infant's repertoire. Notwithstanding an absolute difference in the reported and observed percentages, similar growth trends are expressed in the figures. This is notably true of the items "pivots," "hands together," "hand play," and "regards hands."

Of course sources of error cannot be entirely eliminated from a complicated and rather comprehensive developmental study. An overzealous effort to remove one source of error easily creates or exaggerates some other source of error. Much reliance must be placed upon the general consistency and validity of the method of approach. We have briefly indicated, however, some of the error sources which must be considered in connection with the present study and with any similar undertaking.

CHAPTER VI

THE ANTHROPOMETRIC EXAMINATION

A COMPREHENSIVE study of mental growth must give consideration to problems of physical growth and of body type. For normative reasons it seemed especially desirable to have a series of selected bodily measurements of a homogeneous group of infants. Because of the extensive data on the behavior growth of these same infants, such measurements should have added normative value both for analytic and for comparative purposes. It is hoped eventually to bring the anthropometric data and the behavior data into closer correlation through the developmental study of individual cases.

The measurements obtained are indicated by the record form on page 261. The data on eye and hair color are incomplete because satisfactory color scales were not found until the study was well under way. The particular dimensions taken were selected because the landmarks involved can be determined with relative ease and accuracy. Moreover, these dimensions are basic and enable us to reconstruct the minimum essential features of bodily conformation. As a further aid to the study of body types, photographs of the infants were obtained in the free sitting position. These photographs will be brought into comparison with similar photographs of the same children at the age of 5 years.

§ 1. GENERAL PROCEDURES

In general, we followed the principles of measurement specified by the Report of the 14th International Congress of Prehistoric Anthropology and Archaeology in 1912 concerning standard measurements of living subjects.¹ Certain deviations were essential and others desirable. The recumbent, rather than the erect position, was used for obvious reasons. However, the conditions in the recumbent position were devised to parallel as closely as possible the conditions which were specified for the erect position. By the use of the measuring board in connection with the anthropometer, a high degree of accuracy of the longitudinal measurements was obtained (Fig. 18).

¹ Hrdlicka, Ales. *Anthropometry*. Philadelphia. Wistar Institute of Anatomy and Biology, 1920 Pp. 163

The vertex, suprasternal notch, pubes, acromion process, and costal and cristal margins are among the landmarks defined by the 1912 Congress. Diameters and thorax circumference were taken with the child in the supine position. Certain of these measurements are considerably affected by the child's position. The recumbent position was chosen because any other was difficult to instate with uniformity in infants of varying ages. Furthermore, this posture could be retained for all measurements, and thus unnecessary handling of the infant was avoided.

Other factors being equal, that procedure is best which secures the greatest degree of relaxation of the subject. No procedure is satisfactory with every infant. A slow, leisurely method is best adapted to certain infants, while the same practice is ineffectual and even disastrous when used with others. For most subjects, the mother's presence is a reassuring condition which facilitates the measuring. In very exceptional cases it will be found desirable to dismiss the parent, but this should be done only when she gives some indication that the adjustment would be better without her presence.

Relaxation of the infant is usually most pronounced just after a feeding or a nap. A chirp or some novel sound made by the examiner will frequently quiet the child. Often he can be lured into position by a toy. The use of a blanket to partially cover the infant is usually not desirable. With very young infants, however, its use is permissible if it quiets crying.

The room, the instruments, the examiner's hands, and of course the infant, should be warm. Special precautions in this respect need to be taken in winter.

Measurement readings should be made as soon as the standard position is secured. Immediately after the reading is determined, the examiner should again glance at the subject to see that no change of position has occurred. It is sometimes impossible to obtain standard conditions and in that case deviations from it should be noted.

On recording the measurement, the figures for that measurement made at a previous age should be consulted. Errors of reading the instruments and errors of recording then become so obvious by their incongruity with the rest of the data that, when they do occur, they can be immediately corrected. Naturally observer and recorder should be alert to the possibility of the occurrence of such mistakes. The tabulations and computations should be checked for clerical errors.

Some questions of reliability may be raised because our records are the result of only one determination of each measurement. The exact position of the infant and his state of relaxation even at best are undergoing almost constant change; the infant, as a rule, will tolerate the necessary restraint and manipulation only very briefly. One is forced to choose between making several less carefully controlled records and one more carefully determined observation. Under these conditions it seems better to take one reading at the moment of optimum control of the constantly changing conditions. The unconscious effect on the examiner of relying on multiple determinations rather than one also introduces the possibility of greater personal error.

The Record. The examiner dictated the instrument readings to a recorder who had before her the child's last record. When an incongruous figure was dictated the recorder asked that that measurement be redetermined; otherwise she unquestioningly entered the data on the record form. Davenport² has well pointed out that in measuring growing children, one set of measures may be checked by the preceding set. If this check is not permitted to bias the observer, it is a positive aid in the elimination of errors. The check should be used cautiously, however, with a full realization that the preceding measurement may itself have been in error, or that the child may not have undergone a change.

Order of the Procedure. When the behavior examination was completed, the child was wrapped in a blanket and taken to another room where physical measurements were made. Occasionally when it was necessary to interrupt the examination for feeding or for a sleeping period, the child was measured in the interim between the first and second part of the behavior examination. But, as the Clinic Day table indicates, this was the exception rather than the rule. In a few instances at 16 and at 20 weeks, the measurements were made before any part of the behavior examination was begun. This was done only when a feeding or a nap intervened before the examination.

At the time of the anthropometric measurements, it was natural for the mother to volunteer information concerning the child's recent health. It therefore became routine practice to insert health questions at this point. When the observations were completed, the child was dressed and the interview for securing supplementary data was begun.

² Davenport, Charles B : *Guide to Physical Anthropometry and Anthroscopy*. Cold Spring Harbor, N. Y. Baltimore: Waverly Press, 1927. Pp. 53.

Instruments. The instruments used in securing the measurements are listed in Table 20 and are illustrated in the accompanying photographs (Fig. 19).

TABLE 20
INSTRUMENTS USED FOR ANTHROPOMETRIC MEASUREMENTS

NAME OF INSTRUMENT	MEASUREMENTS FOR WHICH USED	OBTAINED FROM
Martin anthropometer	Longitudinal measurements	F. Rossetti, Freiburg, Germany
Thompson measuring board	Longitudinal measurements	Yale Clinic of Child Development
Spreading calipers	Diameters	Richenbach and Sohn, Zurich, Switzerland
Tape measure, steel	Circumferences	Lufkin Rule Co., U. S. A.
Martin and Schultz, Augenfarbentafel	Eye color	J. F. Lehmanns, Munchen, Germany
Fischer artificial hair samples	Hair color	J. F. Lehmanns, Munchen, Germany

§ 2. PROCEDURE FOR INDIVIDUAL MEASUREMENTS AND OBSERVATIONS

The anthropometric determinations fall into 5 groups: (a) Longitudinal measurements; (b) Diameters; (c) Circumferences; (d) Weight; (e) Supplementary observations. The specific procedures used (and recommended) are categorically expressed for the sake of brevity and clarity.

(a) LONGITUDINAL MEASUREMENTS

SOLES OF THE FEET TO THE VERTEX

Conditions. The pad is put in place on the measuring board. The anthropometer is fitted into the left side of the board. All of the longitudinal measurements should be made in quick succession while the infant is held in the position described for the measurement of the total length. The essentials of the procedure are that the infant lie in line with the anthropometer, legs straight, soles of feet pressed firmly against the foot of the board. The arms are straight beside the body. The head is in line with the body — the Frankfurt-horizontal line vertically directed.

Procedure. (1) Move the anthropometer arm to the head end of the board with the point of the arm touching the floor of the trough. (A necessary precaution to protect the infant from the sharp point.)

(2) Place the pad so that there is a space of about six inches between it and the foot end of the board.

(3) Instruct the mother to place the infant supine on the board so that when he extends his legs the soles of his feet will be about two inches from the foot of the board. Guard against the infant's suddenly turning his head to the side so that he hits the edge of the trough.

(4) Instruct the mother or assistant to hold the child's legs, demonstrating the procedure in the following manner: From a position at the foot end of the board, circle the calves of the child's legs with the fingers, the thumb extending along the anterior surface of the tibia and up over the patella. Extend the legs and by traction on the legs draw the infant down until the soles of his feet, heels together, are in firm contact with the foot board. (Do this very slowly so that the infant remains relaxed.) As the infant is moved, the pad slips down the board, eliminating friction between the child and the board yet permitting the desired full extension of the infant. Stand at the infant's left side while the mother or the assistant carries out the above instructions. Further directions or a second demonstration are sometimes necessary. If, when the above instructions have been carried out, the infant is not in line with the anthropometer, move him to the right or left as is needed.

(5) With the left hand hold the infant's head so that the sagittal plane and Frankfort horizontal are vertical. If the infant shows intolerance of restraint, dangle the bells or any other appropriate toy above him, adjusting the object until the proper head position is obtained.

(6) With the right hand bring the anthropometer arm near the infant's vertex. Then hold the anthropometer arm in the right hand with the index finger along the arm and protruding just beyond its point. With the left hand grasp the anthropometer rod with the fingers and with the left thumb on the collar slowly pull it toward the infant's head until the anthropometer arm when moved up and down barely touches the vertex.

(7) Ascertain the scale reading and proceed quickly to take the next measurement.

SOLES OF THE FEET TO THE SUPRASTERNAL NOTCH

Procedure. (1) Be sure the infant is still in the position described above; then with left thumb and index finger quickly pull the anthropometer arm footward until its extended arm is slightly below the suprasternal notch.

(2) Lower the anthropometer arm and, still protecting the point with the right index finger, bring the anthropometer arm up under the infant's chin.

If the infant's neck is very short it is sometimes necessary to move the anthropometer arm up and down slowly, inserting the point at each movement. Carefully bring it under the child's chin and into the suprasternal notch, protecting the point with the right index finger.

(3) With the left hand bring the collar slightly footward until the anthropometer arm tip just touches the deepest point in the hollow of the notch. As soon as the measurement is read, quickly lift the arm from position and proceed to the next measurement.

SOLES OF THE FEET TO THE PUBES

Procedure. (1) In the manner detailed above move the anthropometer arm footward until it is just above the crease over the pubes.

(2) Move the point of the arm so that it is almost in contact with the child's body and, as before, with the left hand adjust the anthropometer collar footward until the lower edge of the arm is directly above the lowest portion of the crease.

(3) If there is more than one crease, as is frequently the case, palpate to determine which crease most nearly coincides with the upper border of the pubes.

(b) DIAMETERS

BIACROMIAL

Conditions. The longitudinal measurements have been completed, the anthropometer removed, and the child is still lying on the board, the mother standing beside the child. The child's arms are close beside the body.

Procedure. (1) Take the spreading calipers in both hands. Hold them in the standard manner with the index fingers along the outer edges of the caliper tips and the thumbs encircling the caliper arms at the inner margins. The ends of the index fingers should protrude just beyond the caliper ends. Hold the calipers horizontal with the scale visible.

(2) Stand at the foot end of the board, lean forward and palpate the acromial processes with the tip of the index finger. When these have been located slip the caliper ends over the most lateral portion of the processes and ascertain the scale reading. If the child reaches for the calipers, distract his attention with the tricolored rings or bells. If the child brings up his feet to such an extent that they interfere with the measuring, instruct the mother or

assistant to keep his legs down by putting a gentle, restraining hand on his knees.

(3) If the child draws his shoulders forward or shrugs them, or appears very tense, gently hold the upper arms and talk to him until relaxation is secured. Do not take the measurements until the child is in a favorable position.

THORAX

Conditions. The child is lying on the board, the mother standing beside the child, the examiner at the foot of the board.

Procedure. (1) Hold the spreading calipers in the same manner described for securing the biacromial diameter. Place the hands at the side of the child's body. With the index fingers locate the most lateral costal margin at the level of the nipple. If the child is breathing deeply, wait for a moment when he is at rest, then placing the caliper ends in position, quickly obtain the measurement.

(2) If the child is crying, obtain the measurement at a point intermediate to minimum and maximum expansion of the chest.

BICRISTAL

Conditions. The child is still lying on the board, the examiner standing at the foot of the board.

Procedure. (1) Hold the spreading calipers as before. Place the hands at the side of the child's hips and with the fingers locate as definitely as possible the most lateral portions of the iliac crest. Place the index fingers on these points and slide the caliper ends into place.

(2) If the child interferes with the secural of this measurement by lifting his legs, the mother or assistant should be instructed to restrain them by placing the hand gently over the child's knees.

(c) CIRCUMFERENCES

HEAD

Conditions. The infant is lying on the measuring board, the mother or assistant standing at the child's right.

Procedure. (1) Take the position at the child's left side near the head. Hold the tape measure in the right hand and pull the end of the tape with the left hand. Pull the tape out to about the 36 centimeter mark.

(2) With the right hand gently raise the child's head and with the left hand place tape beneath it so that the zero mark of the tape will reach to the child's forehead and so that the tape will encircle the most prominent portion of the occiput.

(3) Replace the child's head on the measuring board; bring the tape around the child's forehead at the glabella and pull the tape until the first perceptible resistance is noticed. Secure reading and quickly remove the tape. If the child has considerable hair, it may be brushed back.

(4) In a very few instances the child actively resists taking this measure. If such is the case, instead of persisting in the procedure described above, the measurement may be taken when the child is in his mother's arms; the tape is placed in the same manner but brought together at the child's occiput rather than over his forehead.

THORAX

Procedure. (1) Hold the tape measure in the right hand and with the left hand pull out the tape to approximately the 36 centimeter mark.

(2) Holding the tape measure with the right hand, place the left hand under the child's back from his right. Insert the end of the tape under the child's back sufficiently so that when brought around his thorax the zero mark will be over the sternum.

(3) Remove the left hand from underneath and, holding the end of the tape in place over the child's thorax, pull the tape around the child's body just over the nipples.

(4) As with the head circumference, determine the tautness by the first perceptible resistance of the tape to further tightening.

(5) If when the hand is placed under the child's thorax he attempts to sit, the mother should be instructed to lean over him and talk to him. Avoid allowing him to fall back and bump his head.

(d) WEIGHT

Conditions. The scales for weighing the infant have been fitted with a board which protects the balance beam from the infant's grasp. (See illustration.) The scale pan on which the infant is to be placed has been provided with a thin sheet of paper and the scale has been balanced with this paper in position.

Procedure. (1) Instruct the mother to place the child either lying or sitting on the scale pan, depending on his postural development. Any toy which he may have been holding should be removed, except in very unusual cases. (See 4 and 5 below.)

(2) Instruct the mother to stand beside the child to guard him from any falls.

(3) Balance the scale as quickly as possible.

(4) If the child places his hands on the board which protects the balance beam, request the mother to distract his attention by dangling a toy before him. In unusual circumstances when the child is very active, he may be weighed holding the toy.

(5) If the child has retained his toy, later determine the weight of the toy and subtract it from his weight.

(6) If for any reason it seems advisable to weigh the infant while wrapped in a blanket, the blanket must be later weighed and its weight subtracted.

(e) SUPPLEMENTARY OBSERVATIONS

EYE AND HAIR COLOR

Conditions. Artificial illumination should be turned off and the shades of the room raised to secure as much daylight as possible. Avoid direct sunlight. The observations may be made either when the child is on the board or when he is held in his mother's arms. The latter procedure is sometimes desirable if it is necessary to obtain more daylight by carrying him to the window.

Procedure. (1) Hold the eye color chart beside the infant's head and if possible obtain his regard for your face. If this is impossible, use the tri-colored rings or bells to attract his attention, holding them so that he must raise the upper lid in order to regard them.

(2) Select that eye of the scale which most nearly matches the infant's eye and describe any variation from this artificial eye.

(3) Hold the hair samples at the side of the infant's head, close to his hair but not touching it. Select that sample which most nearly matches his hair and describe any variations of the infant's hair from the selected sample.

(4) If the hair shades from one color to another, match the separate areas to the sample and designate the areas.

TEETH

Conditions. A tongue depressor is usually not necessary for inspection of the teeth. The teeth may be examined either with the infant still lying on the board or held by his mother.

Procedure. (1) Place the thumb of the right hand on the infant's chin and gently depress the lower jaw. Inspect the upper gums and teeth at a favorable moment when the child smiles or moves the upper lip.

§3. THE RELIABILITY OF THE PHYSICAL MEASUREMENTS

With the collected data completely in hand, the physical measurement records of each individual child were tabulated according to age. The usual statistics, including average and standard deviation, were determined for each age level.

In evaluating the findings, errors inherent in the data must be considered. In the first place, the bodily measurements of the child are inconstant. For instance, Boyd³ quotes Hohlfeld's findings that "Infants from 6 to 13 months of age showed an average decrease in body length of 0.85 cm. after sitting up 1 hour, and 1.12 cm. after standing up 1 hour." Whatever the significance of such variations, there can be no doubt that it is most important to control the child's activity just prior to measurement. It will be seen by reference to the Clinic Day Chart that, almost without exception, before being measured the infant had been through at least part of the behavior examination where he is placed in the sitting posture for the table top situations. In not less than 76 per cent of the cases at any age level, bodily measurements were preceded by the complete behavior examination which involves, for periods gradually increasing in length with age, the assumption of the vertical posture in sitting and more briefly in standing. Whether our special technique of traction on placement on the measuring board stretched the infant to his maximum length is a matter for further investigation. In any event, variation in length due to posture preceding the examination was to some extent kept constant for the subjects by virtue of the similarity in the routine of the Clinic Day.

Variability in the pressure applied in holding the feet against the end of the measuring board, the alignment of the child, the dorso-ventral curvature

³ Boyd, Edith: "The Experimental Error Inherent in Measuring the Growing Human Body" *Amer. Journ. Physical Anthropol.*, 1929, 13, 389-431. (See page 395)

of his spine, and his head posturing are further possible sources of error which our methods were designed to avoid. The degree of the muscular tension of the subject measured is variable under any uniform procedure. By avoiding the introduction of a new examiner (the examiner who made the behavior examination ordinarily also measured the child); by having the child's mother at his side; by keeping room, instruments, and hands warm; by distracting the child with a toy or a diverting sound; and by imposing only partial restraint, a maximum of relaxation was attained. We subjectively estimated how successful we were in securing a normal, relaxed posture. Measurements of shoulder breadth are particularly influenced by tension and while taking this measurement the observer probably can best estimate the child's state of tension.

Head circumference is distorted by the unavoidable inclusion of the infant's hair, even though it is usually scant and fine. Any change in the normal breathing depth or rate affects the chest circumference. The longitudinal measurements as well as the diameters and the circumferences are influenced by the child's subcutaneous fat, although the landmarks and dimensions which we have chosen are less influenced by this factor than other landmarks and dimensions which might have been selected. Of course weight varies with food intake and excretory losses. So the infant himself introduces many individual varying factors, only a relatively few of which can be held entirely constant from child to child.

In addition, the personal error of the examiner must be considered. With the exception of the infants less than 16 weeks of age the physical measurements were made by the same person (H.T.). Her techniques had been developed in connection with an earlier investigation and remained relatively stable over a period of four years. There was a conscious effort to preserve uniformity of procedure, and at most the variations of not more than two persons are involved.

The general and the specific reliability of the anthropometric data have, therefore, been favorably influenced by the considerable homogeneity of the group of subjects and the relatively uniform conditions under which the measurements were made.

PART TWO
NORMS OF INFANT GROWTH

CHAPTER VII

BEHAVIOR NORMS

THE present chapter assembles all the tabular inventories of behavior items derived from the normative survey.¹ To facilitate reference, the items are grouped by situations and the situations are arranged in alphabetic order.

To dissect behavior responses into fragmentary items does violence to the reality of the infant's behavior and is justifiable only if the process results in a clearer understanding and interpretation of the total flow of activity. The tabular summary inventories presented here depict the behavior growth trends in terms of behavior items but they should not suggest that the infant is merely a bundle of items, or that he is like Humpty-Dumpty fallen from the wall. The infant has already been "put together again" in an earlier publication, *Infant Behavior: Its Genesis and Growth*. In still another publication, *An Atlas of Infant Behavior*, he is even preserved in the full totality which he enjoyed before his analytical tumble. In the *Atlas*, numerous specimen behavior patterns are pictured in their organic sequence for detailed study.

In the present volume the emphasis is on the analytic and symptomatic aspects of specific behavior items and values. Such emphasis would scarcely be warranted if the integral character of infant behavior had not received strong consideration in the earlier expositions just mentioned.

Appended to each of the tables which follow, the reader will find specific page references to representative behavior items which are delineated in the action photographs of the *Atlas*. Students who wish to pursue a detailed study of behavior items in their organic relation to the total flow of activity may consult these photographs. The basic cinema films will also be made available.

The tables list behavior items which were found in the survey of the entire normative group. The *Atlas* illustrates varied infants who in given situations typify the behavior characteristic of the group as a whole. The pictorial delineations of such representative infants may be profitably brought into comparison with the normative trends set forth in the tables.

¹ The tables are reproduced with the permission and through the courtesy of the McGraw-Hill Book Company, publishers of the present authors' volume entitled *Infant Behavior: Its Genesis and Growth*, N. Y., 1934. Pp. 343. See especially Chapter Three.

Supplementary notes and a glossary provide definitions and comments for items which need special explanation. The individual items are specified by designatory letters and numbers. In the normative tables which follow, §§ 1-40, percentages of 50 and above are printed in bold face type; frequencies of less than 50 per cent which have some indicative import are printed in italics. A dash sign (—) signifies that the item was not analyzed because of its negligible status for the ages concerned. An ellipsis (...) signifies that the item was not analyzed because the data were either unavailable or indecisive. There are a few items in which the percentage frequencies are based upon data gained through reports by the mothers. These items are indicated by the letter *r* in parentheses (r).

Readers who are interested in the genetic interpretation of the developmental trends shown in the table may consult the volume on *Infant Behavior: Its Genesis and Growth* which devotes a section to each normative situation. For initial orientation, the reader is referred to the chapter on "The Ontogenetic Patterning of Behavior" in the same volume. This chapter gives a brief but inclusive overview of the growing complex of behavior from the embryonic period through the first year of life.

§ 1. BALL PLAY BEHAVIOR (40 weeks-56 weeks)

SITUATION: BALL PLAY (Ba)

Ba	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards Examiner or Examiner's hand											58	58	92	84	86
2	Regards Ex or Ex.'s hand, failure delayed	.										53	8	4	3	5
3	Retains ball	..										53	38	29	23	14
4	Releases ball without defined ref to Ex	.										47	13	33	35	23
5	Pushes or hits ball on platform											31	33	20	10	14
6	Responds											21	50	79	81	77
7	Places ball in Examiner's hand											5	25	25	16	9
8	Throws or rolls ball											21	46	71	74	77
9	Throws or rolls ball to Examiner											5	25	58	61	68
10	Throws ball											0	8	46	58	64
11	Definite repetitive ball play											0	4	13	29	59

In all normative tables, percentages of 50 and above are printed in bold face. Frequencies less than 50 which have indicative import are printed in italics.

BALL PLAY

Item

- Ba 3 In addition to simple retention of the ball, the child may mouth it, transfer it, or wave it. In all instances he retains it
- 4 Co-operative ball play may be shown later in the situation.
- 6 Includes extending the ball to the Examiner, or rolling or throwing the ball whether or not directly toward the Examiner.

Atlas Delineations

- Ba 3 Retains ball 40 weeks, p 519, a-d (releases only fortuitously)
- 5 Pushes or hits ball on platform: 44 weeks, p 519, a-d
- 11 Definite repetitive ball play. 48 weeks, p 519, a-d

§ 2. BELL BEHAVIOR (16 weeks–56 weeks)

SITUATION: BELL (B)

B	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards (s m p or n m p)					100	100	100	100	100	100	100	100	100	100	100
2	Regards	.	.	.		95	100	100	100	100	100	100	100	100	100	100
3	Regards immediately	.	.	.		86	96	97	100	100	100	97	100	100	100	100
4	Regards momentarily	.	.	.		5	20	—	—	4	14	3	4	7	18	16
5	Regards recurrently	.	.	.		50	24	3	17	—	—	—	—	—	—	—
6	Regards starily	.	.	.		59	12	7	—	40	77	100	100	100	100	100
7	Regards predominantly	.	.	.		73	72	90	100	96	100	100	100	100	100	100
8	Regards consistently	.	.	.		95	44	14	—	—	—	—	—	—	—	—
9	Regards prolongedly before approach	.	.	.		54	52	10	3	—	—	—	—	—	—	—
10	Inspects before approach	.	.	.		50	24	3	7	8	—	—	—	—	—	—
11	Regards handle predominantly	.	.	.		64	40	3	—	—	—	—	—	—	—	—
12	Regards handle first	.	.	.		59	40	10	20	12	18	27	19	14	40	72
13	Shifts regard	.	.	.		18	24	3	17	4	7	3	4	3	3	3
14	Shifts regard to surroundings	.	.	.		9	20	3	7	12	7	20	12	10	23	43
15	Shifts regard to Examiner	.	.	.		45	64	97	100	100	100	100	100	100	100	100
16	Arms increase activity	.	.	.		23	60	90	100	100	100	100	100	100	100	100
17	Approaches bell	.	.	.		23	24	—	—	—	—	—	—	—	—	—
18	Approaches after delay	.	.	.		—	36	90	100	100	100	100	100	100	100	100
19	Approaches promptly	.	.	.		—	12	28	28	27	14	27	12	3	10	96
20	Approaches with both hands	.	.	.		23	44	62	72	65	75	74	84	81	93	96
21	Approaches with one hand	.	.	.		9	12	45	31	46	50	57	65	61	52	52
22	Approaches with right hand	.	.	.		14	32	17	44	19	25	17	19	31	20	29
23	Approaches with left hand	.	.	.		23	64	90	100	100	100	100	100	100	100	100
24	Contacts	.	.	.		—	—	7	66	62	61	40	42	24	—	—
25	Inverts hand on approach	.	.	.		23	40	35	38	12	7	13	8	—	—	—
26	Dislodges on contact	.	.	.		23	40	35	45	20	18	23	8	—	—	—
27	Manipulates without grasping	.	.	.		—	40	83	100	100	100	100	100	100	100	100
28	Grasps	.	.	.		—	12	14	10	—	4	—	—	—	—	—
29	Grasps after delay	.	.	.		23	69	90	100	96	100	100	100	100	100	100
30	Grasps promptly	.	.	.		23	45	28	54	54	53	58	58	59	64	96
31	Grasps with right hand only	.	.	.		28	24	48	23	21	23	8	24	13	13	24
32	Grasps with left hand only	.	.	.		40	48	31	8	7	13	4	27	14	10	16
33	Grasps with left or right hand	.	.	.		—	—	10	47	4	—	4	10	5	5	5
34	Grasps in palm	.	.	.		—	—	17	31	35	39	40	58	59	67	52
35	Grasps interdigitally	.	.	.		—	—	—	—	7	17	15	24	31	36	48
36	Grasps with thumb opposition	.	.	.		—	—	—	—	8	11	20	34	31	36	32
37	Grasps with thumb and first two fingers	.	.	.		—	—	—	—	11	29	10	8	7	5	4
38	Grasps top of handle	.	.	.		—	8	35	41	19	29	10	20	35	21	38
39	Holds with both hands	.	.	.		—	10	7	12	18	20	35	35	30	4	4
40	Manip., holding between thumb and fingers	.	.	.		—	55	59	38	32	27	19	14	18	24	24
41	Manip., holding with fingers around handle	.	.	.		—	8	14	24	4	4	7	12	7	8	8
42	Manipulates, holding bowl rim	.	.	.		—	12	24	31	27	32	40	42	24	15	8
43	Manip., holding with fingers around bowl	.	.	.		23	48	45	41	40	15	23	16	0	5	16
44	Manipulates, holding by clapper	.	.	.		—	4	44	6	—	—	—	—	—	—	—
45	Manipulates bell on table top	.	.	.		—	8	17	6	28	11	10	12	0	5	4
46	Drags on table top	.	.	.		—	36	76	100	100	100	100	100	100	100	100
47	Pushes and pulls	.	.	.		—	16	35	76	100	96	100	100	100	100	100
48	Lifts	.	.	.		—	8	21	38	42	32	43	27	35	30	4
49	Manipulates above table top	.	.	.		—	—	21	52	62	54	87	81	79	69	68
50	Bangs on table top	.	.	.		—	4	10	34	47	50	76	92	83	94	88
51	Brings to mouth	.	.	.		—	—	3	21	38	46	60	72	82	82	52
52	Mouths bell handle	.	.	.		—	—	—	—	12	4	20	19	7	13	28
53	Transfers	.	.	.		—	12	17	55	73	82	83	89	69	62	44
54	Transfers frequently	.	.	.		—	—	24	35	43	43	53	46	38	21	20
55	Turns bell end for end	.	.	.		—	—	4	10	34	47	50	76	92	83	88
56	Waves	.	.	.		—	—	—	—	31	38	46	60	72	82	82
57	Rungs	.	.	.		—	—	—	—	12	4	20	19	7	13	28
58	Pokes	.	.	.		—	—	—	—	14	35	22	70	54	76	68
59	Regards clapper	.	.	.		—	4	7	0	12	21	43	50	65	66	72
60	Pokes clapper	.	.	.		—	—	—	—	—	—	—	12	10	23	16
61	Pulls clapper	.	.	.		—	—	4	3	3	4	7	10	15	24	10
62	Brings bell to platform	.	.	.		—	—	—	—	7	8	7	10	29	21	10
63	Brings bell to side panel	.	.	.		—	—	—	—	—	—	—	8	3	8	40
64	Profers bell to Examiner (or mother)	.	.	.		—	—	—	—	—	—	—	—	—	—	—
65	Drops	.	.	.		—	—	20	42	45	27	21	43	38	24	28
66	(If grasps) drops bell	.	.	.		—	—	50	50	57	27	21	43	38	24	28
67	Pursues bell (if drops)	.	.	.		—	—	45	55	91	50	80	88	88	100	88
68	(If drops) resecures bell	.	.	.		—	—	40	45	91	50	80	88	88	100	88
69	Releases and rescues bell	.	.	.		—	—	8	17	32	50	47	81	81	89	94
70	Waves bell after demonstration	.	.	.		—	—	—	—	10	41	37	60	49	53	88
71	Rings bell after demonstration	.	.	.		—	—	—	—	10	0	0	20	32	15	33
72	Waves or rings bell only after demonstration	.	.	.		—	—	—	—	22	50	47	60	49	73	61
73	Waves or rings bell both be and af. demon.	.	.	.		—	—	—	—	—	—	—	—	—	—	50
74	Postural activity	.	.	.		5	8	3	—	—	8	43	58	38	48	40
75	Pulls to side	.	.	.		—	—	—	—	—	4	7	15	10	15	15
76	Pivots	.	.	.		—	—	23	24	35	14	12	25	7	31	34
77	Frets	.	.	.		—	—	14	20	14	10	15	32	43	27	24
78	Vocalizes	.	.	.		—	—	—	—	—	—	—	—	23	23	32

BELL

- Item*
- B 12 After 16 weeks the initial focus of regard is difficult to determine because it shifts rapidly
 25 Inverting the hand on approach is evidently an adaptation for subsequent grasp.
 39 Includes only cases who hold the bell with both hands for a definite interval of time; simple transfer of bell from hand to hand is excluded, for this involves a mere moment of holding by both hands.

Atlas Delineations

- B 3 Regards immediately: *16 weeks*, p. 440, B (2 25 sec)
 5 Regards recurrently. *16 weeks*, p. 440, A-D
 6 Regards starily: *16 weeks*, p. 440, B
 9 Regards prolongedly before approach: *16 weeks*, p. 440, B
 10 Inspects before approach: *20 weeks*, p. 444, B
 12 Regards handle first: *16 weeks*, p. 440, B
 13 Shifts regard: *16 weeks*, p. 441, F
 16 Arms increase activity: *16 weeks*, p. 440, C-H
 18 Approaches after delay: *16 weeks*, p. 440, D; *20 weeks*, p. 444, D
 19 Approaches promptly: *24 weeks*, p. 448, A
 20 Approaches with both hands: *24 weeks*, p. 448, A; *32 weeks*, p. 456, B
 21 Approaches with one hand: *16 weeks*, p. 440, A-H, *20 weeks*, p. 444, A-H
 23 Approaches with left hand: *28 weeks*, p. 452, B
 24 Contacts: *20 weeks*, p. 445, E
 25 Inverts hand on approach: *28 weeks*, p. 452, B-C
 26 Dislodges on contact. *20 weeks*, p. 444-5, D-E, *28 weeks*, p. 452, D
 28 Grasps: *24 weeks*, p. 448, D
 30 Grasps promptly. *24 weeks*, p. 448, A-D (2 50 sec after bell replaced in s m position)
 34 Grasps in palm: *24 weeks*, p. 449, F
 35 Grasps interdigitally. *20 weeks*, p. 445, E
 If the bell position had been more favorable for grasp, it is obvious, from the hand posture, that
 grasp would have been interdigital
 36 Grasps with thumb opposition: *44 weeks*, p. 468, D
 38 Grasps top of handle. *44 weeks*, p. 468, B
 39 Holds with both hands: *24 weeks*, p. 449, H
 40 Manipulates, holding between thumb and fingers: *52 weeks*, p. 476, C; p. 477, G
 48 Lifts: *24 weeks*, p. 449, F
 49 Manipulates above table top: *28 weeks*, p. 453, F-H
 50 Bangs on table top: *28 weeks*, p. 453, H (banging not shown)
 51 Brings to mouth: *24 weeks*, p. 449, F
 52 Mouths bell handle: *24 weeks*, p. 449, F; *32 weeks*, p. 456, C (not as characteristic of 32 as 28 weeks)
 53 Transfers: *28 weeks*, p. 453, H
 54 Transfers frequently: *36 weeks*, pp. 460-1, A-H (6 times)
 56 Waves. *36 weeks*, p. 461, F, G
 57 Rings: *40 weeks*, p. 465, G
 59 Regards clapper *28 weeks*, p. 453, G-*40 weeks* (not usual at this age), p. 464, D
 60 Pokes clapper: *44 weeks*, p. 468, C; p. 469, G
 64 Proffers bell to Examiner: *56 weeks*, p. 480, D
 66 If grasps, drops bell. *24 weeks*, p. 449, G
 73 Waves or rings bell both before and after demonstration: *32 weeks*, p. 457, F-G
 (Demonstration not shown but subsequent behavior similar)

§ 3. BELL RINGING (4 weeks-24 weeks)

SITUATION: BELL RINGING (Br)

Br	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Postural activity ceases	45	39	29	23	20	37	25								
2	Postural activity diminishes	71	71	61	45	43	37	25								
3	Starts or blinks	7	18	21	14	9	17	11								
4	Regards Examiner	7	14	43	41	34	17	18								
5	Turns head	10	7	25	9	39	67	89								
6	Turns head to bell	7	7	18	9	27	47	79								

BELL RINGING

The bell was rung opposite each ear and this was repeated twice so that the child had four chances to respond to the sound. The child might therefore be checked for more than one response. The percentages, however, are based not on the total number of responses but on the number of children.

Item

- Br 1-5 These responses were credited only when they followed the stimulus immediately.
- 1 Any immediate, usually brief, total quieting of the infant after the bell is rung.
 - 2 Includes cessation as well as any immediate, usually brief, noticeable lessening of activity.
 - 3 Any complete or partial start.
 - 4 This behavior is usually accompanied by widening of the eyes and reduction of activity.
 - 5 The head is turned either to the right or left not necessarily to the side from which the sound came
 - 6 This item was checked when the total behavior pattern of the infant tended to indicate that the response was related to the ringing of the bell. When the child looked at the examiner and then turned to the bell this was counted as turning the head to the bell, even if the response was delayed and was not followed by visual regard of the bell.

§ 4. CONSECUTIVE CUBES BEHAVIOR (12 weeks–56 weeks)
SITUATION CONSECUTIVE CUBES (CC)

CC	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56	
1	Regards Examiner's withdrawing hand				17	21	16	7	0	—	—	—	—	—	—	19	
2	Shifts regard				78	94	52	55	51	75	44	73	68	85	80	81	
3	Shifts regard to surroundings				22	44	16	10	20	28	26	40	25	33	24	27	
4	Shifts regard to Examiner				17	35	23	31	22	46	26	30	50	52	60	54	
5	Shifts regard to hand				36	69	32	14	14	3	—	—	—	—	—	—	
6	Approaches cube				22	33	71	86	100	100	100	100	100	100	100	100	
7	Approaches after delay									—	41	76	56	60	56	27	
8	Approaches with one hand				17	15	30	30	46	74	82	92	92	96	68	72	
9	Approaches with index finger								3	4	4	7	20	15	13	8	
10	Ap. cube on T T. with cube in hand on pre							3	0	0	0	41	43	60	65	52	55
11	Reaches for cube beyond reach								27	50	28	3	—	—	—	—	
12	Scratches table top (T T)								6	62	70	14	7	3	0	—	
13	Grasps without securing cube									—	—	—	—	—	—	—	
14	Grasps cube									16	42	86	100	100	100	100	
15	Grasps only one cube									11	33	24	12	14	0	—	
16	Grasps first and second cubes										—	63	77	82	89	96	87
17	Grasps first, second, and third cubes										—	—	18	32	43	45	66
18	Grasps cube in right hand											—	26	36	44	41	50
19	Retains a cube in each hand											44	35	65	100	100	96
20	Holds one cube and grasps another											..	3	17	50	48	79
21	Grasps with thumb opposing fingers											..	49	69	82	89	90
22	Inspects cube in hand											17	29	30	44	50	66
23	Manipulates cubes											30	57	72	92	92	100
24	Pushes or hits cube out of reach											—	—	44	53	25	—
25	Pushes and pulls cubes on table top											11	35	53	58	56	25
26	Bangs cube on table top											—	3	42	70	35	70
27	Cube to mouth											5	13	42	62	88	85
28	Brings free hand to cube at mouth											—	13	20	52	40	37
29	Pokes cube											..	..	..	0	23	15
30	Manip cube above T T (ex. of transfer)											—	—	28	39	48	57
31	Transfers cube											..	9	24	63	75	85
32	Rotates cube											..	3	19	26	32	27
33	Twiddles cube											..	..	..	..	..	20
34	Picks up one cube after another											85	69	71	76	90	87
35	Drops cube on table if grasps											..	..	..	..	..	81
36	Casts cube											5	8	39	71	72	87
37	If drops cube, resecures it											3	6	30	69	63	75
38	Resecures cube from table											..	..	..	..	..	27
39	Brings cube to side rail											..	..	..	..	..	42
40	Drops cube over side rail											..	3	13	8	37	43
41	Carries or pursues cube to platform											..	20	23	23	36	36
42	Drops and pursues cube to platform											..	..	0	4	22	23
43	Brings cube to platform											..	..	..	..	..	36
44	Resecures cube from platform											..	..	7	0	14	25
45	If drops, resecures cube from platform (if grasps)											..	..	..	..	..	27
46	Combines two cubes											..	..	29	0	50	66
47	Brings two cubes together											7	3	3	12	48	68
48	Pushes cube with cube in hand											0	0	0	0	15	39
49	Hits cube on table top with cube in hand											..	..	..	..	..	43
50	Places cube in hand on cube on table top											0	0	0	0	22	43
51	Builds tower of two cubes											0	0	0	0	0	40
52	Offers cube to Examiner or mother											..	..	..	..	..	21
53	Leans											..	..	..	..	..	45
54	Postural activity											32	28	51	37	42	30
55	Pivots											..	..	..	..	..	35
56	Turns to side rail											..	..	..	..	..	27
57	Creeps											..	..	..	..	..	31
58	Attempts to stand											26	15	35	38	33	30
59	Vocalizes											..	..	..	..	..	38

The foregoing table (page 102) assembles the items listed in the First, Second, and Third Cube situations. Each item displayed by any one child in one or all of these three situations was listed *once* in compiling the table.

<i>Item</i>	CONSECUTIVE CUBES
CC 3	The surroundings include the dome, window, or other parts of the room except the table top, Examiner, mother, or test material itself
6	Any hand activity directed toward the cubes while regarding them
7	Includes case where the child promptly approaches the cube, withdraws the hand, and approaches again
8	There may be and frequently is a slight approach with the other hand
10	The cube in hand is retained and is either touched, or hit against, or placed on the cube on the table
12	Includes a "raking" like activity of the hand on the table top
14	Does not, of course, include the cases where the cube was grasped when placed in the hand, but only those where the reaching and grasping were spontaneous.
18	Grasps any cube with the right hand, on presentation.
19	This may occur when the cubes are placed in the hand, or as a result of the child's own active grasping
22	At 32 weeks, particularly this regard for the cube frequently follows mouthing of it. The child will pick up a cube, carry it to the mouth, chew it, remove it, regard it, sometimes with wrist rotation, and then either carry it to the mouth, drop it on the table, or pursue some other form of activity
23	Does not imply that the cube is grasped and picked up, but merely that the cube is in some way handled
24	This behavior may not be associated with manipulation of a cube, but may be the result of an unsuccessful attempt to grasp it
28	While holding a cube at the mouth, the other hand is brought up to the cube and both hands press the cube against the gums, as the child chews the cube.
30	Includes rotation, holding two cubes together or hitting them together
33	Holds a cube between thumb and fingers or thumb and index finger and rotates it
47	This differs from CC46 in that both cubes are moved, while in item CC46 one cube may be hit against another which rests on the table.
50	This item includes placement followed by release; it is probably incipient tower building.
54	Includes pivoting, turning to the side rail, crawling, creeping, kneeling, and attempting to stand.

Atlas Delineations

<i>Item</i>	
CC 2	Shifts regard: <i>12 weeks</i> , p. 285, a-d
5	Shifts regard to hand: <i>16 weeks</i> , p. 287, d
6	Approaches cube: <i>20 weeks</i> , p. 289, a
10	Approaches cube on table top with cube in hand on presentation: <i>36 weeks</i> , p. 297, h (more characteristic of <i>40 weeks</i>)
11	Reaches for cube beyond reach: <i>28 weeks</i> , p. 293, f
17	Grasps first, second, and third cubes: <i>40 weeks</i> , p. 299, a-f
18	Grasps cube in right hand: <i>44 weeks</i> , p. 301, a
21	Grasps with thumb opposing fingers <i>28 weeks</i> , p. 293, c
22	Inspects cube in hand: <i>32 weeks</i> , p. 295, b, c, f
24	Pushes or hits cube out of reach: <i>28 weeks</i> , p. 293, e
26	Bangs cube on table top: <i>28 weeks</i> , p. 293, h
27	Cube to mouth: <i>24 weeks</i> , p. 291, d
28	Brings free hand to cube at mouth: <i>28 weeks</i> , p. 293, c (starts to)
41	Carries or pursues cube to platform: <i>44 weeks</i> , p. 301, h
46	Combines two cubes: <i>28 weeks</i> , p. 293, h, <i>32 weeks</i> , p. 295, f (characteristic of <i>36 weeks</i>); <i>36 weeks</i> , p. 297, f
59	Vocalizes: <i>44 weeks</i> , p. 301, d (vocalization noted in dictated record)

§ 5. FIRST CUBE (12 weeks-56 weeks)

SITUATION: FIRST CUBE (CC1)

CC1	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards cube (s m p or n m p)				78	100	97	100	100	100	100	100	100	100	100	100
2	Regards cube (n m p)				57	80										
3	Regards cube				48	81	90	97	96	100	100	100	100	100	100	100
4	Regards after delay				43	25	27	13	0	4	0	8	4	8	0	0
5	Regards immediately				61	75	73	77	100	96	100	100	92	96	92	96
6	Regards momentarily				48	79	33	10	4							
7	Regards recurrently				30	56	40	27	27	37	21	40	35	45	63	65
8	Regards intermittently				4	22	27	3								
9	Regards prolongedly				26	37	27	27	12	0	0	0	..	..	..	..
10	Regards passively				39	62	27	7	0							
11	Regards actively				35	38	73	93	100	100	100	100	100	100	100	100
12	Regards consistently						30	53	89	89	96	93	96	96	92	100
13	Regards predominantly				48	62	71	100								
14	Regards Examiner's presenting hand				48	17	17	3								
15	Regards hand				52	65	30	10	4				..	..
16	Regards hand predominantly				48	48										
17	Shifts regard				78	92	43	30	27	37	21	40	35	45	63	65
18	Shifts regard from cube to hand				26	48	12	13	13	3	—	—	—	—	—	—
19	Shifts regard to table top				22	48										
20	Arms increase activity					81	90	100	100	100	100	100	100	100	100	100
21	Directs approach				22	25	50	83	100	100	100	100	100	100	97	100
22	If approaches, approaches after delay					30	34	12	—	—	7	7	8	11	13	12
23	Contacts				22	40	61	90	100	100	100	100	100	100	100	100
24	Dislodges on contact					0	6	33	45	42	19	14	3	0		
25	Grasps					0	8	33	77	96	100	100	100	100	100	100
26	(In hand) holds actively				50	60	81	83	100	100	100	100	100	100	100	100
27	Manipulates on table top				0	10	35	53	42	30	21	20	12	7	26	15
28	Bangs on table top						3	30	31	32	43	33	42	41	26	23
29	Rubs cube on table top or platform									7	11	30	8	11	13	7
30	Lifts cube				15	23	58	80	100	100	100	100	100	100	100	100
31	Brings cube to mouth				5	10	37	48	85	89	68	63	54	33	37	19
32	Manipulates and mouths								54	57	45	53	38	24	15	—
33	Transfers							3	19	62	70	64	66	65	45	42
34	Manip. above table top without trans								—	18	26	28	7	26	15	38
35	Drops immediately				50	54	47	27	4							
36	Drops on table				60	47	43	62	37	29	13	27	26	32	46	
37	Resecures from table top if drops on T T.						13	40	60	27	90	23	74	100	75	59
38	Slaps table top							—	28	27	18	36	33	20	14	3

FIRST CUBE

Item

- CC1 6 Includes what was described as a fleeting regard for the cube
 10 Regard for the cube unaccompanied or followed by directed hand activity, straining, mouthing, eye widening, and other activities
 11 Regard for the cube which is followed or accompanied by some form of directed hand activity. Visual pursuit of the cube does not constitute active regard.
 34 Compare with CC1-30.
 36 At 16 weeks the dropping is immediate, while at 28 weeks it occurs after the child engages in some activity with the cube.
 37 Percentages are based on the number of cases who drop the cube to the table. It should be noted that at 40 weeks only 13 per cent of the infants drop the cube to the table.

Atlas Delineations

- CC1 5 Regards immediately: *12 weeks*, p. 285, a, b
 15 Regards hand: *12 weeks*, p. 285, c, *16 weeks*, p. 287, b
 21 Directs approach: *20 weeks*, p. 289, a, b
 23 Contacts: *20 weeks*, p. 289, b
 25 Grasps: *24 weeks*, p. 291, c
 28 Bangs on table top: *44 weeks*, p. 301, b (see text)
 29 Rubs cube on table top or platform: *44 weeks*, p. 301 b (more common at *40 weeks*) (see text)
 31 Brings cube to mouth: *28 weeks*, p. 293, c
 35 Drops immediately: *12 weeks*, p. 285, g, h

§ 6. SECOND CUBE (16 weeks–56 weeks)

SITUATION. SECOND CUBE (CC2)

CC2	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards						100	96	100	100	100	100	100	100	100	100
2	Regards intermittently						0	42	8	4	.	.	.	.	.	.
3	Regards passively						85	31	12	4	.	.	.	.	.	.
4	Regards actively						15	69	88	96	100	100	100	100	100	100
5	Directs approach to second cube						20	46	84	100	96	100	100	100	97	100
6	Approaches after delay						10	15	24	8	15	25	27	36	19	18
7	Drops first as second is presented						70	73	56	46	19	18	7	8	7	3
8	Retains first as second is presented						30	27	44	54	81	82	93	92	93	97
9	Dislodges on contact						5	19	24	40	33	7	3	16	11	0
10	Ap sec. cube with cube in hand on pre						.	.	.	.	7	14	10	24	15	11
11	Grasps second cube						—	12	63	85	82	89	96	88	100	95
12	Manipulates cube on table top						10	35	57	54	45	32	27	38	30	21
13	Bangs cube on table top						.	10	35	15	25	30	36	19	18	24
14	Brings cube to mouth						5	15	44	42	67	50	66	24	11	24
15	Manipulates and mouths a cube						—	—	22	25	37	42	19	3	8	.
16	Transfers a cube						—	4	7	31	26	43	40	56	45	26
17	Man. cube above table top without trans						—	—	—	14	37	33	26	18	43	52
18	Drops a cube on table top						60	65	65	56	61	60	64	59	45	72
19	Resecures a cube from table top if drops on T.T.						5	0	12	68	37	66	43	50	100	89
																78

SECOND CUBE

All items from 12 to 19 inclusive refer to activity with either *the first or the second cube* after the second cube has been presented.

Item

- CC2 3-4 See item CC1, 10 and 11.
 12 Includes pushing, dragging, rubbing, or patting the cube or other similar activity, the cube remaining in contact with table.
 17 See CC1-30 and CC1-34

Atlas Delineations

- CC2 8 Retains first as second is presented: *28 weeks*, p. 293, d
 9 Dislodges on contact: *28 weeks*, p. 293, e

§ 7. THIRD CUBE (16 weeks–56 weeks)

SITUATION. THIRD CUBE (CC3)

CC3	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards third cube					87	100	90	96	100	100	100	100	100	100	100
2	Regards passively					74	47	23	12	—						
3	Regards actively					13	53	67	84	100	100	100	100	100	100	100
4	Approaches after delay					7	5	14	4	26	25	7	17	19	34	32
5	Drops one cube as third is presented					7	53	57	28	45	39	67	24	45	18	20
6	Drops two cubes as third is presented					33	37	33	52	15	29	10	8	11	8	20
7	Directs approach to third cube					14	25	48	88	89	79	93	100	85	90	100
8	Ap third c with c in hand as third is pre					.	.	.	37	43	57	63	48	55	68	
9	Grasps third cube					6	5	31	36	45	54	66	50	56	42	72
10	Manipulates without grasping				..	—	—	8	45	25	37	16	30	45	29	28
11	Manipulates cube on table top					20	26	27	60	59	71	57	54	63	53	32
12	Bangs cube					.	.	24	19	29	23	13	26	18	12	
13	Pushes or hits cube		.	.		.	.	.	33	46	47	58	37	41	40	
14	Hits cube on table top with cube in hand		.	.		.	.	.	15	32	40	38	15	29	37	
15	Places cube on cube		.	.		.	.	.	—	4	10	20	7	30	44	
16	Brings cube to mouth		.	.		13	10	23	12	26	36	62	20	30	8	16
17	Man cube above table top without trans		.	.		.	.	.	—	10	11	16	23	17	21	32
18	Drops cube on table		.	.		47	70	70	76	79	64	70	56	63	61	92
19	Resécuries cube from table top .	.	.	.		0	0	24	49	72	81	76	66	83	75	52

THIRD CUBE

Item

- CC3 2, 3 See CC1, 10 and 11.
 5, 6 It should be remembered that the procedure for the presentation of the third cube involves placing a cube in each hand. As the child turns his attention to the third cube which is presented, he may drop one or both cubes which he is holding.
 10 At 28 weeks the manipulation involves pushing or hitting the cube on the table with the hand, while at 48 weeks there is definite pushing of the cube on the table top with the cube in hand.
 10-19 Refer to either the first, second, or third cube but the behavior occurs after the third cube has been presented.
 11 At 32 weeks includes pushing and hitting a cube on the table top with cube in hand.

Atlas Delineations

- CC3 5 Drops one cube as third is presented: 20 weeks, p. 289, g, h
 8 Approaches third cube with cube in hand as third is presented: 36 weeks, p. 297, h (more characteristic of 40 weeks)
 11 Manipulates cube on table top: 28 weeks, p. 293, h (see text)

§ 8. MASSED CUBES BEHAVIOR (16 weeks-56 weeks)

SITUATION. MASSED CUBES (CM)

CM	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56	
1	Regards cardboard screen .					42	64	85	93	82	93	87	59	83	63	70	
2	Reaches for screen .	.	.			—	23	65	64	68	75	73	45	48	45	41	
3	Grasps screen .	.	.			—	—	4	11	39	36	50	36	21	18	7	
4	Regards cube (s m p) .	.	.			58	95	100	—	—	—	—	—	—	—	—	
5	Regards starily .	.	.			17	18	12	4	—	—	—	—	—	—	—	
6	Regards intermittently .	.	.			37	18	0	—	—	—	—	—	—	—	—	
7	Shifts regard .	.	.			58	45	27	25	21	18	37	41	21	33	67	
8	Shifts regard to surroundings .	.	.			26	27	31	7	4	7	10	22	7	7	67	
9	Shifts regard to Examiner .	.	.			31	27	8	28	18	14	20	41	14	23	41	
10	Shifts regard to hand .	.	.			42	14	4	—	—	—	—	—	—	—	—	
11	Shifts regard from cube to cube .	.	.			10	41	62	82	79	86	83	74	83	63	63	
12	Pursues visually to platform or floor .	.	.			63	95	100	100	100	100	100	100	100	100	100	
13	Arms increase activity .	.	.			21	18	12	7	4	4	3	—	—	—	—	
14	Scratches table top .	.	.			15	14	23	29	4	43	10	11	24	8	15	
15	Slaps table top .	.	.			47	86	100	100	100	100	100	100	100	100	100	
16	Contacts cube .	.	.			—	—	8	39	32	25	13	—	—	—	—	
17	Reaches for cube out of reach .	.	.			47	77	69	36	18	11	17	11	7	15	—	
18	Dislodges on contact .	.	.			5	45	5	19	36	54	32	50	33	24	30	37
19	Grasps a cube .	.	.			—	—	12	25	32	39	60	70	52	55	33	
20	Grasps two cubes at once .	.	.			—	—	18	29	25	40	30	17	8	7	7	
21	Holds one cube and grasps another .	.	.			—	—	4	14	18	14	17	22	14	20	7	
22	Hold two cubes, drops one as grasps an .	.	.			—	—	4	7	7	10	19	38	35	45	45	
23	Released cube and immediately resecures it .	.	.			—	—	—	—	—	—	—	—	—	—	—	
24	Grasps one cube after another .	.	.			—	—	—	—	—	—	—	—	—	—	—	
25	Transposes one cube after an using same hand .	.	.			—	—	—	—	—	—	—	—	—	—	—	
26	Holds one cube, grasps one cube after an .	.	.			—	—	—	—	—	—	—	—	—	—	—	
27	Holds two cu., gr one af an us same hand .	.	.			—	—	—	—	—	—	—	—	—	—	—	
28	Grasps one cube after an confined to table top .	.	.			—	—	—	—	—	—	—	—	—	—	—	
29	Holds two cubes .	.	.			—	—	—	—	—	—	—	—	—	—	—	
30	Holds two cubes in one hand .	.	.			—	—	—	—	—	—	—	—	—	—	—	
31	Drags cube .	.	.			—	—	—	—	—	—	—	—	—	—	—	
32	Pushes cube out of reach .	.	.			—	—	—	—	—	—	—	—	—	—	—	
33	Scatters cubes .	.	.			26	82	92	68	36	39	47	37	45	40	37	
34	Hits cube to platform .	.	.			14	27	32	43	32	33	26	35	30	19	—	
35	Lifts a cube .	.	.			—	36	69	96	100	100	100	100	98	100	—	
36	Brings cube to mouth .	.	.			—	14	38	50	36	61	50	41	24	20	4	
37	Bangs cube on table top .	.	.			—	—	15	32	39	32	23	19	24	28	11	
38	Manipulates cube above table top .	.	.			—	9	23	25	32	36	37	67	45	38	41	
39	Transfers cube .	.	.			—	5	15	14	14	29	20	22	10	13	11	
40	Drops cube .	.	.			—	36	50	79	79	96	83	82	100	88	89	
41	(If drops) drops immediately .	.	.			—	88	62	14	14	7	0	—	—	—	—	
42	Drops one cube as attends to another .	.	.			—	—	34	21	8	—	—	—	—	—	—	
43	Drops cube in hand as ap or grasps another .	.	.			—	—	23	25	25	29	23	4	—	—	—	
44	Drops one cube and grasps another .	.	.			—	—	15	46	54	57	70	63	83	63	74	
45	Drops cube on table top .	.	.			—	—	32	42	61	71	93	63	70	63	78	
46	Drops cube to platform .	.	.			—	5	8	29	29	43	47	30	48	38	52	
47	Drops cube to floor .	.	.			—	—	—	14	29	36	57	37	38	32	15	
48	Pursues cube to platform .	.	.			—	—	4	7	7	13	26	55	42	56	37	
49	Transposes cubes .	.	.			—	—	—	—	—	—	3	4	38	18	33	
50	Casts cube .	.	.			—	—	4	29	39	43	53	41	50	30	—	
51	Combines two cubes .	.	.			—	—	4	25	39	37	41	44	14	23	4	
52	Hits or pu cu on ta top with cu in hand .	.	.			—	—	4	25	39	37	41	44	14	23	4	
53	Places cube on cube .	.	.			—	—	—	—	—	—	3	4	17	28	19	
54	Average number of cubes picked up .	.	.			—	0	1	2	3	3	3	4	5	5	7	
55	Picks up one cube or more .	.	.			—	45	77	96	100	100	100	100	100	95	100	
56	Picks up two or more cubes .	.	.			—	9	46	75	86	93	93	96	97	95	96	
57	Picks up three or more cubes .	.	.			—	5	15	50	64	71	73	67	90	83	82	
58	Picks up four or more cubes .	.	.			—	8	29	43	43	57	56	76	65	74	74	
59	Picks up five or more cubes .	.	.			—	—	14	14	11	30	41	73	45	67	67	
60	Picks up six or more cubes .	.	.			—	—	—	7	11	11	13	30	52	40	56	
61	Picks up seven or more cubes .	.	.			—	31	82	96	82	79	71	73	57	83	48	
62	Disarranges cubes .	.	.			—	21	23	35	14	7	14	20	22	3	4	
63	Leans .	.	.			—	—	—	—	7	18	37	37	31	45	56	
64	Postural activity .	.	.			—	26	14	42	18	11	25	27	41	45	15	
65	Vocalizes .	.	.			—	10	9	8	6	7	6	6	6	6	—	
66	Average No cubes remain. on T.T .	.	.	.	.	—	—	—	—	—	—	—	—	—	—	—

MASSED CUBES

Item

- CM 1 The child focuses attention on the cardboard screen concealing the cubes rather than on the surroundings.
- 3 At 56 weeks the child not infrequently grabbed the screen while the Examiner was arranging the cubes. This pulling over of the screen was not included, but instead the item refers to behavior as the screen was withdrawn.

Item

- CM 5 The regard seems to be for the pile of cubes as a whole rather than for the individual cubes.
 11 As the cubes lie on the table top the child looks from one to the other This shifting of the regard is more significant at the early age levels
 14 Scratching, fingering, kneading
 15 This activity may occur immediately after the cubes are removed from the table top
 18 The behavior may represent unsuccessful prehension or it may be a more definite form of exploiting the situation It relates to the behavior before grasping takes place, it may occur on the first approach to the cubes.
 20 One in each hand.
 33 Cf CM, 62 The cubes are scattered in approach or as an activity in itself and not merely the result of other ways of handling them
 38 Includes transfer, rotation, fingering, or any activity with the cube in hand inclusive of combining it with another cube.
 42 The dropping of one cube as the child turns his attention to another cube is associated with the approach and grasp for the regarded cube
 46 At 40 weeks the cube is likely to be dropped, at 48 weeks it is likely to be thrown, and at 56 weeks it is likely to be carried to the platform
 48 The cube is dropped or carried to the platform and pursued there with exploitation or resecural
 49 Places cubes from one place on the table top to another or from the table top to the platform or from platform to table top.
 51 Combining includes any activity which brings two cubes into relation and contact with each other such as hitting or pushing a cube with a cube, bringing two cubes together, and tower building.
 62 When the Examiner concluded the situation, the position of the cubes on the table top was noted Moderate disarrangement of the cubes is not included
 63 Leans forward or to the side
 64 Includes turning to the side, pivoting, creeping, standing or attempts to stand

Atlas Delineations

- CM 3 Grasps screen: 36 weeks, p 311, a (reaches for screen as it is withdrawn), 40 weeks, p. 311, a (see text)
 7 Shifts regard: 16 weeks, p 307, c, d
 10 Shifts regard to hand: 16 weeks, p 307, c
 19 Grasp a cube. 24 weeks, p 309, c (see text)
 20 Grasps two cubes at once: 32 weeks, p 309, a
 21 Holds one cube and grasps another: 40 weeks, p 311, b
 29 Holds two cubes. 32 weeks, p 309, b
 30 Holds two cubes in one hand. 32 weeks, p 309, a
 33 Scatters cubes 20 weeks, p. 307, d
 34 Hits cube to platform: 32 weeks, p 309, c (see text)
 35 Lifts a cube. 24 weeks, p 309, d (see text)
 48 Pursues cube to platform. 40 weeks, p 311, c
 49 Transposes cubes: 48 weeks, p. 313, b-c, 52 weeks, p. 313, c
 51 Combines two cubes: 28 weeks, p 309, c
 56 Picks up two or more cubes. 28 weeks, p 309, a-d

§ 9. TOWER BUILDING BEHAVIOR (40 weeks-56 weeks)

SITUATION. TOWER BUILDING (Ct)

Ct	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Ap cube on table top with cube in hand											45	44	75	76	86
2	Hits or pushes cube with cube											45	33	33	28	0
3	Places cube on cube	.										9	11	42	40	79
4	Releases cube on cube											0	11	25	16	43
5	Postural activity	.										10	14	22	14	50

Item

TOWER BUILDING

- CT 4 At 48 weeks the released cube is apt to fall so that a tower is not built.

Atlas Delineations

- CT 3 Places cube on cube: 48 weeks, p 318, B, C
 4 Releases cube on cube: 52 weeks, p 323, H, 56 weeks, p 325, C

§ 10. CUP BEHAVIOR (12 weeks-36 weeks)

SITUATION CUP (Cp)

Cp	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards immediately				81	89	97	100	100	100	100					.
2	Regards momentarily				37	22	9	3	—	—	—					.
3	Regards recurrently				44	68	28	21	4	18	15					.
4	Regards prolongedly (n m p)				56	69										.
5	Regards prolongedly				37	57	47	3	—	—	—					.
6	Regards predominantly				73	93	94	100	100	100	100					.
7	Regards consistently				0	5	38	66	100	100	100					.
8	Shifts regard				80	73	31	23	10	25	23					.
9	Shifts regard to surroundings				40	33	6	3	—	4	15					.
10	Shifts regard to hand				47	45	13	7	—	—	—					.
11	Shifts regard from cup to hand				20	28	15	3	—	—	—					.
12	Arm increases activity (s p or n m p)				75	79	78	93	100	100	100					.
13	Brings hand to mouth (s p or n m p)				50	21										.
14	Hands active on table top (s p or n m p)				36	67										.
15	Approaches (n m p)				44	79										.
16	Approaches				6	25	72	91	100	100	100					.
17	Approaches promptly (n m p)				25	55										.
18	Approaches promptly				6	13	44	81	96	100	100					.
19	Approaches after delay (n m p)				25	23										.
20	Approaches with both hands				6	11	34	41	69	50	50					.
21	Approaches handle first				0	5	25	38	56	64	58					.
22	Contacts (n m p)				44	67										.
23	Contacts				6	15	69	91	100	100	100					.
24	Dislodges on contact (n m p)				25	52										.
25	Dislodges on contact				9	53	50	38	29	8						.
26	Grasps					13	52	85	100	100						.
27	Grasps with both hands (n m p . or s.p.)					5	22	53	52	36	42					.
28	Grasps with both hands						3	28	33	32	31					.
29	Grasps with one hand						9	35	52	75	69					.
30	Manipulates with hands encircling cup						6	24	56	50	42					.
31	Manipulates grasping by rim						0	0	45	64	62					.
32	Manipulates grasping by handle						6	31	59	92	81					.
33	Pushes or hits					14	31	30	41	3	4					.
34	Pushes or drags cup						19	24	33	50	31					.
35	Bangs on table top						3	6	37	36	58					.
36	Turns cup over on table top						6	26	14	17	8					.
37	Lifts cup						6	45	82	100	100					.
38	Lifts by handle						6	35	59	79	81					.
39	Brings to mouth						3	24	63	60	66					.
40	Manipulates above table top						0	21	67	86	89					.
41	Manipulates initially above table top						3	3	26	18	35					.
42	Holds with both hands						3	35	63	46	46					.
43	Transfers						—	—	19	43	42					.
44	Turns cup right side up						6	3	56	71	62					.
45	Rotates						3	—	3	21	31					.
46	Drops						6	38	63	61	42					.
47	Drops and resecures						—	7	15	39	19					.
48	Fusses						6	7	12	27	7	18	11			.

CUP

Item

- Cp 12 The behavior indicated by this item may be described for the early age levels as follows. The head is lowered, arms are raised and lowered abruptly and irregularly, the hands may be brought nearer the cup or together. More advanced reaching responses are also checked as *arm increases activity*
- 42 Does not include transferring the cup from one hand to the other but implies a more prolonged holding of the cup with both hands.

Atlas Delineations

- Cp 8 Shifts regard: *12 weeks*, p. 327, h, *16 weeks*, p. 329, c
 10 Shifts regard to hand: *12 weeks*, p. 327, e
 12 Arm increases activity: *12 weeks*, p. 327, c
 14 Hands active on table top: *16 weeks*, p. 329, f
 15 Approaches: *16 weeks*, p. 329, e
 20 Approaches with both hands: *28 weeks*, p. 335, a
 21 Approaches handle first: *24 weeks*, p. 333, b-e (not characteristic until *28 weeks*)
 22 Contacts (n m p): *16 weeks*, p. 329, f
 25 Dislodges on contact: *20 weeks*, p. 331, g, h; *24 weeks*, p. 333, b
 29 Grasps with one hand: *32 weeks*, p. 337, c
 30 Manipulates with hands encircling cup: *28 weeks*, p. 335, f
 31 Manipulates grasping by rim: *28 weeks*, p. 335, e
 32 Manipulates grasping by handle: *28 weeks*, p. 335, h
 34 Pushes or drags: *36 weeks*, p. 339, d
 35 Bangs on table top: *36 weeks*, p. 339, b
 38 Lifts by handle: *24 weeks*, p. 333, g
 39 Brings to mouth: *24 weeks*, p. 333, h (see text); *28 weeks*, p. 335, e
 41 Manipulates initially above table top: *36 weeks*, p. 339, b
 42 Holds with both hands: *28 weeks*, p. 335, b, d, c, f
 43 Transfers: *28 weeks*, p. 335, g, h
 44 Turns cup right side up: *28 weeks*, p. 335, b
 46 Drops: *28 weeks*, p. 335, e (see text)

§11. CUP AND CUBES BEHAVIOR (32 weeks-56 weeks)

SITUATIONS. CUP AND CUBES (Cp-C)

Cp-C	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards cubes first									72	76	75	88	68	74	85
2	Attends predominantly to cubes									56	56	32	60	32	17	15
3	Attends alternately to cup and cubes									66	60	68	60	32	26	0
4	Attends simultaneously to cup and cubes									33	28	35	40	57	64	85
5	Shifts regard to Examiner									5	8	14	20	25	31	30
6	Approaches promptly									100	96	96	96	100	100	100
7	Approaches cubes first									61	68	71	84	57	77	82
8	Grasps cube									94	92	93	100	86	89	100
9	Grasps more than one cube									55	64	71	68	71	77	89
10	Average number cubes grasped									1	2	2	2	3	3	5
11	Grasps cup									66	60	64	56	79	82	82
12	Grasps cup only or cubes only									39	52	43	44	39	28	19
13	Confines some manipulation to cubes									61	64	61	68	68	69	67
14	Pushes or scatters cubes									28	44	43	28	14	31	4
15	Brings cube to mouth									39	40	18	36	25	15	11
16	Transfers cube									22	28	4	20	14	11	11
17	Casts cube									11	4	18	8	35	38	22
18	Releases and resecures cube									0	4	7	36	29	54	41
19	Drops cube, regrasps or grasps another									39	32	57	44	61	56	78
20	Picks up one cube after another									5	12	11	28	36	51	67
21	Casts or brings cube to platform									0	12	21	28	39	41	33
22	Confines some manipulation to cup									72	52	57	56	61	67	45
23	Lifts cup									22	40	50	52	64	74	70
24	Brings cup to mouth									28	12	21	20	14	29	19
25	Manipulates cup above table top									—	8	11	16	25	18	15
26	Transfers cup									—	4	7	4	18	10	7
27	Drops cup									44	44	46	40	39	51	37
28	Brings cup to platform									0	8	4	24	29	28	41
29	Drops cube, grasps cup									28	12	18	28	35	51	45
30	Grasps cube, cup in hand									33	20	28	12	43	46	48
31	Holds cup and cube, one in each hand									50	32	46	48	46	59	52
32	Holds two cubes, one in each hand									33	40	61	64	46	43	45
33	Combines cube and cube or cube and cup									33	32	57	68	72	72	82
34	Combines cube and cup									22	20	32	40	14	8	15
35	Combines cup and cube									22	16	39	40	71	70	74
36	Brings one object to another									28	28	50	60	68	69	73
37	Hits one object on another									28	28	46	36	25	20	26
38	Brings two objects together									5	12	24	16	14	10	15
39	Brings cube over cup									5	0	18	28	54	59	74
40	Places one or more cubes in cup									5	0	0	12	39	54	74
41	Releases cube in cup									—	—	0	12	32	51	63
42	Places two or more cubes in cup									—	—	4	18	38	63	
43	Releases more than one cube in cup									—	—	4	18	33	52	
44	Releases three or more cubes in cup									—	—	—	11	15	56	
45	Releases four or more cubes in cup									—	—	—	—	0	13	48
46	Releases five or more cubes in cup									—	—	—	—	—	0	45
47	Average number of cubes placed in cup									—	—	0	1	1	4	
48	Removes cube from cup									—	14	16	35	41	56	
49	Lifts cup containing cubes									0	12	18	20	39	51	59
50	Postural activity									8	18	12	32	40	11	
51	Turns to side									—	—	—	—	—	—	

CUP AND CUBES

Item

- Cp-C 14 Includes scattering the cubes by hitting or slapping at them.
 20 Frequent or repeated release and resecural
 27 Drops cup at the early age levels may not be preceded by lifting it The child may grasp the cup, drag it to the table edge, and drop it over the table edge
 29 Includes picking up the cup after the child has released the cubes into the cup
 38 Cup and cube or cube and cube
 43-46 Places or drops Excludes cases where cube is placed but not released.
 50 Turns to side, pivots, kneels, creeps, stands, or attempts to stand.

Atlas Delineations

- Cp-C 2 Attends predominantly to cubes 32 weeks, p. 369, a-d, 36 weeks, p. 369, a-d
 3 Attends alternately to cup and cubes 44 weeks, p. 373, a-d (see text)
 4 Attends simultaneously to cup and cubes 40 weeks, p. 371, a-h
 12 Grasps cup only or cubes only: 36 weeks, p. 369, a-d
 15 Brings cube to mouth: 36 weeks, p. 369, b
 21 Casts or brings cube to platform: 52 weeks, p. 375, h
 28 Brings cup to platform. 52 weeks, p. 375, h
 35 Combines cup and cube 48 weeks, p. 373, c
 37 Hits one object on another 40 weeks, p. 371, c (see text), also h
 40 Places one or more cubes in cup: 48 weeks, p. 373, d
 44 Releases three or more cubes in cup: 52 weeks, p. 375, c-h
 45 Releases four or more cubes in cup 56 weeks, p. 377, a-g
 48 Removes cube from cup: 56 weeks, p. 377, f
 49 Lifts cup containing cubes: 52 weeks, p. 375, g

§ 12. CUP AND SPOON BEHAVIOR (32 weeks-56 weeks)

SITUATION CUP AND SPOON (Cp-Sp)

Cp-Sp	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards cup and spoon									53	61	76	84	100	100	100
2	Regards cup and spoon alternately									59	60	21	23	—	—	—
3	Regards cup or spoon recurrently									4	11	21	38	27	37	65
4	Shifts regard to surroundings									—	4	4	23	12	10	4
5	Shifts regard to Examiner									4	—	14	23	23	22	54
6	Approaches cup first									59	50	55	42	31	24	4
7	Approaches spoon first									41	25	21	42	50	66	96
8	Ap. cup and spoon simultaneously									0	25	24	15	19	10	—
9	Grasps cup									81	96	97	96	80	86	89
10	Grasps spoon									97	86	97	100	100	97	100
11	Pushes and pulls cup or spoon									63	36	38	34	16	24	12
12	Bangs cup or spoon on table top									33	64	69	54	54	29	19
13	Hits or bangs cup on table top									15	40	54	38	38	7	12
14	Hits or bangs spoon on table top									22	32	31	27	38	30	19
15	Lifts cup									63	79	93	92	80	84	77
16	Brings cup or spoon to mouth									70	64	69	54	31	34	38
17	Brings cup to mouth									33	36	58	50	23	26	19
18	Brings spoon to mouth									55	47	27	19	12	12	26
19	Transfers cup or spoon									37	50	52	65	50	30	50
20	Transfers cup									8	18	35	46	27	10	4
21	Transfers spoon									30	40	35	38	23	22	50
22	Rotates cup									19	26	41	58	46	41	46
23	Releases cup									52	50	62	54	54	44	46
24	Releases spoon									63	43	66	62	77	51	54
25	Resecures cup, if releases									42	30	27	50	65	55	26
26	Resecures spoon, if releases									35	58	68	80	65	47	57
27	Releases and resecures cup or spoon									30	32	59	54	69	41	38
28	Releases and resecures cup									22	15	17	27	35	24	12
29	Releases and resecures spoon									22	25	45	50	50	24	31
30	Drops one reaching for other									33	29	24	15	23	12	15
31	Retains one, reaches for other									63	54	83	89	65	80	85
32	Retains one, secures other									48	54	79	89	65	80	85
33	Combines cup and spoon									59	57	83	89	92	95	100
34	Brings cup and spoon together									19	25	28	54	54	52	62
35	Brings spoon over cup									7	4	31	65	77	85	100
36	Places spoon in cup									4	24	50	65	85	100	100
37	Releases spoon in cup									4	—	—	27	24	38	—
	SPOON RATTLE DEMONSTRATED															
38	Combines cup and spoon									29	48	50	65	84	84	96
39	Com. cup and spoon only after demon									21	22	35	15	16	10	—
40	Combining improves after demonstration										35	46	48	58	46	46
41	Hits or rattles spoon in cup										15	19	40	45	45	62
	BEFORE OR AFTER DEMONSTRATION															
42	Hits or rattles spoon in cup										14	27	42	65	65	65
43	Kneels or stands									—	—	3	12	8	30	8
44	Pivots									—	11	14	23	35	34	46
45	Frets									22	11	14	27	4	15	12
46	Vocalizes									29	32	31	54	23	34	42
47	Smiles									7	7	15	12	12	12	35

CUP AND SPOON

Item

- Cp-Sp 2 Refers to regard during activity with the cup and spoon
 3 Does not include alternating regard for cup and spoon.
 22 Includes turning the cup over and over, turning it simply on its side or turning it over to an inverted position
 23, 24 Does not include transfer of cup or spoon
 25, 26 Based on the number releasing.
 41 Manipulation of the cup so that the spoon is rattled or hit within cup is not included.

Atlas Delineations

- Cp-Sp 2 Regards cup and spoon alternately: 32 weeks, p. 359, a (see text)
 5 Shifts regard to Examiner: 32 weeks, p. 359, d (normative at 56 weeks)
 6 Approaches cup first: 40 weeks, p. 361, a
 7 Approaches spoon first: 48 weeks, p. 365, a
 13 Hits or bangs cup on table top: 36 weeks, p. 359, d (normative at 40 weeks)
 14 Hits or bangs spoon on table top: 44 weeks, p. 363, d (more characteristic of 48 weeks)
 17 Brings cup to mouth: 36 weeks, p. 359, c (normative at 40 weeks)
 18 Brings spoon to mouth: 32 weeks, p. 359, d
 20 Transfers cup: 44 weeks, p. 363, a, b, c
 22 Rotates cup: 44 weeks, p. 363, a, b (rotates as transfers)
 36 Places spoon in cup: 40 weeks, p. 361, c, 44 weeks, p. 363, e (normative at 44 weeks)
 37 Releases spoon in cup: 56 weeks, p. 367, d
 38 Combines cup and spoon: 40 weeks, p. 361, g
 41 Hits or rattles spoon in cup: 44 weeks, p. 363, e
 42 Hits or rattles spoon in cup after demonstration. 52 weeks, p. 365, g, h (normative at 52 weeks)

§ 13. CUP-SHOE-BOX (48 weeks-56 weeks)

SITUATION CUP-SHOE-BOX (C-S-B)

C-S-B	BEHAVIOR ITEMS	CUP-SHOE-BOX														
		4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Responds to "shoe" . . :	:	:	:										14	37	57
2	Disregards "box" . . :	:	:	:										90	70	71

CUP-SHOE-BOX

Item

- C-S-B 1, 2 The response is usually visual; the child may glance immediately toward the correct object or may indicate his understanding by a prolonged stare at it. He may even be reaching toward a desired object and momentarily look at the other as the Examiner names it.

§ 14. FORMBOARD BEHAVIOR (20 weeks-56 weeks)

SITUATION. FORMBOARD (F)

F	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
FORMBOARD ALONE																
1	Contacts						83	97	100	100	100	100	100	100	100	100
2	Undirected hand-arm activity						65	48	32	9	0	0	0	0	0	0
3	Approaches						74	94	100	100	97	100	94	93	97	100
4	Manipulates without grasp						48	65	52	56	47	41	41	26	33	10
5	Places hands in holes						17	52	45	47	32	35	25	29	33	25
6	Moves about on table top						57	68	71	75	65	41	50	28	31	35
7	Pushes						39	55	42	34	24	15	31	32	23	20
8	Pulls or drags						22	26	45	53	38	24	16	10	5	10
9	Lifts						4	13	32	50	71	74	72	74	82	90
10	Pulls off table top						13	7	19	38	21	6	13	10	5	5
11	Brings to platform						0	0	10	9	6	27	19	13	0	0
12	Brings to side rail						0	0	0	0	0	0	0	0	0	0
13	Releases						0	3	10	22	24	38	31	32	23	80
14	Turns over						0	0	0	0	6	6	13	13	28	35
15	Fusses						9	35	10	6	3	12	6	7	15	0
BLOCK PRESENTED																
16	Contacts round block						57	89	87	81	100	100	100	100	100	100
17	Examiner places block in hand						50	21	10	0	0	0	0	0	0	0
18	Holds block only momentarily						50	18	0	0	0	0	0	0	0	0
19	Holds block actively						20	64	94	88	97	91	91	94	90	100
20	Block to mouth						9	57	68	50	62	50	36	32	18	15
21	Block to mouth immediately						9	50	45	34	36	24	12	0	0	0
22	Transfers block						7	7	35	31	30	44	33	18	10	19
23	Turns block						0	7	23	16	40	38	40	44	25	23
24	Drops block						72	54	58	53	58	68	73	74	83	92
25	Drops block on table top						43	50	29	38	27	35	21	29	8	12
26	Releases block on formboard						29	18	29	19	33	41	42	56	68	77
27	Resecures released block						0	7	16	16	9	24	21	21	25	54
28	Manipulates formboard						21	18	16	25	42	18	36	29	33	23
29	Brings block to formboard						28	18	42	34	49	62	76	78	89	92
30	Hits block on formboard						0	4	13	19	18	21	36	21	5	8
31	Brings block in relation to holes						7	4	7	6	18	21	36	41	60	85
32	Applies block in vicinity of hole						0	4	0	0	0	3	9	12	33	35
33	Releases block in vicinity of hole						0	0	0	3	3	3	15	34	40	62
34	Incipient insertion of block						0	0	0	3	0	0	9	21	18	38
35	Inserts block in hole						0	0	0	3	0	0	9	21	18	38
BLOCK IN HOLE																
36	Contacts block in hole						60	71	87	97	100	100	97	100	100	92
37	Attempts secural of block						40	57	68	94	100	100	97	100	100	92
38	(If attempts secural) unsuccessful						100	67	62	41	26	3	12	3	0	4
39	(If attempts) gives evidence of difficulty						100	91	81	76	77	66	67	69	23	12
40	Scratches at block in hole						0	19	23	35	20	23	24	25	3	4
41	Pushes at block in hole						20	19	52	55	65	60	61	56	31	24
42	Turns block about in hole						0	14	29	49	39	26	21	13	5	4
43	Pulls at block in hole						40	24	26	52	55	54	58	47	38	28
44	Removes block from hole						0	14	29	61	74	97	88	97	100	84
45	Removes block immediately						0	0	13	23	23	34	30	41	72	76
46	Pushes block out from hole						0	5	23	32	42	54	51	50	31	28
47	Pulls block out from hole						0	5	7	35	42	37	42	34	38	20
48	Pulls or picks out block from hole						0	5	7	35	42	37	46	50	62	64
49	Picks out or grasps block						0	0	0	0	0	0	6	16	26	52
50	Grasps block after removal						0	0	10	35	55	77	73	81	87	68
51	Mouths block						0	0	3	16	29	23	18	19	5	4
52	Carries block to side rail or platform						0	0	0	3	3	29	40	9	5	12
53	Manipulates formboard						0	14	29	23	23	46	18	22	23	20
54	Brings block to formboard						0	0	0	10	30	60	52	58	64	52
55	Hits block on formboard						0	0	0	0	13	29	21	13	5	8
56	Releases block on formboard or table top						0	0	7	26	35	54	51	75	79	68
57	Releases block on formboard						0	0	0	0	0	19	29	27	50	48
58	Brings block to vicinity of holes						0	0	0	0	0	3	17	30	19	21
59	Brings block to formboard holes						0	0	0	0	3	9	3	3	18	41
60	Incipient insertion of block in hole						0	0	0	0	3	0	3	6	28	44
61	Inserts block in hole						0	0	0	0	0	11	3	6	28	44
62	Postural activity						0	0	0	0	0	0	11	28	29	50
63	Frets						20	29	32	32	23	3	15	22	5	16

FORMBOARD

- Item*
- F 4 Scratches, fingers, or slaps the formboard surface or holes
 5 Places one or both hands in any hole with or without some activity in the hole as scratching, fingering, patting, or thrusting the hand through
 6 Includes pushing, pulling, dragging, or any moving of the formboard about the table
 7 At 24 weeks 29% push the board laterally. At 28 weeks 32% push forward out of reach
 27 Includes removing the block after insertion in the hole. At 56 weeks 27% remove the block from the hole after they themselves insert it.
 28 Grasps, pats, pulls up, or fingers board, or scratches in the holes.
 29 Hits, applies, releases, or inserts
 34 Includes releases in vicinity of round hole, places in hole without release, releases over hole without insertion, and inserts block in hole
 43 Does not include picks out or spans but does include successful removal by pulling
 49 Grasps the block and lifts it, or, by prying it with the thumb, raises the block and grasps it, lifting it from the hole
 53 Pushes, pulls, slaps, lifts, scratches, or fingers the formboard holes.
 56, 57 Includes releases block near hole or in hole.
 60 Releases in vicinity of hole, places in the hole without release or insertion
 62 Turning to side, pivoting, kneeling, creeping and standing.

Atlas Delineations

- F 4 Manipulates without grasp: 24 weeks, p 511, a-b
 5 Places hands in holes: 24 weeks, p 511, a-b
 8 Pulls formboard. 28 weeks, p 511, a-b
 9 Lifts: 36 weeks, p 513, a
 10 Pulls off table top: 32 weeks, p 513, b
 17 Examiner places block in hand. 20 weeks, p 511, b
 18 Holds block only momentarily: 20 weeks, p. 511, c
 19 Holds block actively: 24 weeks, p 511, c
 21 Block to mouth (immediately) 24 weeks, p 511, c
 22 Transfers block. 32 weeks, p. 513, c (see text)
 31 Brings block in relation to holes: 48 weeks, p 515, b, c, d (normative at 52 weeks)
 33 Releases block in vicinity of hole: 52 weeks, p 517, b
 34 Incipient insertion of block: 56 weeks, p 517, g
 37 Attempts secural of block. 24 weeks, p 511, d
 40 Scratches at block in hole: 24 weeks, p. 511, d, 28 weeks, p. 511, d
 42 Turns block about in hole: 32 weeks, p. 513, d (see text)
 43 Pulls at block in hole: 32 weeks, p. 513, d (see text)
 44 Removes block from hole: 32 weeks, p 513, d (see text)
 46 Pushes block out from hole: 40 weeks, p 513, d
 55 Hits block on formboard: 44 weeks, p. 515, d (more characteristic of 40 weeks)
 61 Inserts block in hole. 52 weeks, p. 517, d

§ 15. GIVE IT TO ME (40 weeks-56 weeks)

SITUATION: GIVE IT TO ME (G)

G	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Does not respond											50	21	24	11	15
2	Regards Examiner or Examiner's hand											43	0	19	4	20
3	Extends object to Examiner											50	79	76	85	45
4	Releases object						.	.				29	53	71	77	75
5	Places object in Examiner's hand						.	.				29	21	38	19	10
6	Releases object in Examiner's hand						.	.	.	.		7	17	43	63	30
7	Releases object but not to Examiner						.					0	0	0	7	25

GIVE IT TO ME

- Item*
- G 1 No extension or release of object. The child frequently puts the object in the mouth.
 2 The release of the object, if it occurs at all, is delayed.
 3 Includes taps or places in Examiner's hand and gives to E.
 6 Excludes when the Examiner takes hold.

§ 16. MIRROR BEHAVIOR (40 weeks-56 weeks)

SITUATION: MIRROR (M)

M	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Sober											43	29	26	13	27
2	Smiles											61	71	57	52	73
3	Vocalizes											43	43	30	57	55
4	Waves arms											22	38	17	13	9
5	Brings hands to mirror											61	81	74	57	55
6	Pats mirror											17	19	13	17	41
7	Approaches image socially											13	43	30	65	64
8	Brings face to mirror											13	33	17	39	55
9	Plays peekaboo with image											0	0	4	17	23
10	Postural activity											17	29	48	61	64
11	Stands											9	14	22	30	45

*Atlas Delineations**Item*

- M 4 Waves arms. 44 weeks, p. 521, d
 7 Approaches image socially: 52 weeks, p. 523, e-h
 8 Brings face to mirror. 52 weeks, p. 523, g, h
 11 Stands. 56 weeks, p. 523, b (rests on one foot and one knee)

§ 17. PAPER AND CRAYON BEHAVIOR (36 weeks-56 weeks)

SITUATION: PAPER AND CRAYON (Pa-Cr)

Pa-Cr	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
CRAYON BESIDE PAPER																
1	Approaches crayon first										52	85	92	81	85	96
2	Approaches paper first										43	19	8	8	15	4
3	Manipulates crayon exclusively										43	54	46	35	26	17
4	Manipulates paper										48	27	17	38	36	41
5	Brings crayon to mouth										67	50	42	31	26	15
6	Transfers crayon										33	38	42	15	18	33
7	Combines paper and crayon spon.										5	19	33	42	54	74
8	Hits crayon on paper										0	19	25	15	31	32
9	Marks on paper with crayon										5	15	25	38	46	74
10	Makes staccato marks										0	11	27	18	38	39
11	Makes staccato marks only										0	11	23	14	33	0
12	Makes linear marks										5	4	4	14	10	74
13	Makes linear marks only										5	4	0	11	5	35
14	Makes short linear marks										0	4	4	7	8	57
15	Makes both staccato and linear marks										0	0	4	4	5	39
16	Average number of marks										0	0	1	2	2	5
17	Average number of staccato marks										0	0	1	1	2	2
18	Average number of linear marks										0	0	0	0	0	3
SCRIBBLE DEMONSTRATED																
19	Regards scribble demonstration										72	89	92	91	80	85
20	Manipulates paper during demonstration										45	38	29	14	13	—
21	Manipulates paper										45	56	46	18	30	35
22	Hits crayon on table top										9	22	15	29	3	4
23	Brings crayon to mouth										73	59	42	36	23	12
24	Combines crayon and paper										5	30	54	64	83	92
25	Combines paper and crayon repeatedly										0	8	15	14	43	58
26	Hits crayon on or at paper										5	26	31	46	38	15
27	Marks on one or more sheets										14	37	50	50	62	96
28	Marks on two or more sheets										9	19	31	36	54	87
29	Marks on three or more sheets										0	4	15	25	33	57
30	Draws crayon over paper										0	0	23	29	54	62
31	Makes lin. marks on one or more sheets										5	11	19	32	43	91
32	Linear marks on two or more sheets										0	4	8	21	31	74
33	Linear marks on three sheets										0	0	4	11	15	52
34	Makes linear marks only										0	7	8	18	30	74
35	Adaptive respon apparently increases										14	26	42	43	50	57
36	Aver num of staccato marks to a page										0	1	1	2	2	1
37	Aver num of linear marks to a page										0	0	1	2	3	6

PAPER AND CRAYON

An analysis of both the dictated record and the marks on the paper was made. Any discrepancy which exists between these percentages is due to the fact that occasionally a mark would be made on the paper either by the Examiner as she was removing the paper and crayon or by the child as the crayon was manipulated in some way obviously not in relation to the paper, as for example transferring crayon from one hand to the other or in merely lifting the crayon to the mouth. Also sometimes the crayon is brought to the paper and definitely applied to it without a mark having been made.

Item

- Pa-Cr 4 At 36 weeks, picks up; at 48 weeks grabs or tears, at 52 weeks picks up or crumples; at 56 weeks lifts or inspects and releases
 7 Includes dangling crayon on paper.
 20 At 36 weeks picks up, at 40 weeks grabs, picks up, turns, or crumples; and at 56 weeks pulls at.
 27 At 44 weeks one case did not have a paper record.

Atlas Delineations

- Pa-Cr 23 Brings crayon to mouth: 36 weeks, p 505, b, d

§ 18. PELLET BEHAVIOR (12 weeks-56 weeks)

SITUATION. PELLET (P)

P	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards (s m p or n m p)				28	50	91	94	97	100	100	100	100	100	100	100
2	Regards with definite fixation				15	34	80	89	97	100	100	100	100	100	100	100
3	"Regards" (confirmed)				5	27	74	83	94	96	100	100	100	100	100	100
4	Regards after delay				21	20	44	33	24	12	11	3	3	.	.	.
5	(If regards) regards after delay				75	45	48	35	25	12	11	3	3	.	.	.
6	Regards immediately				0	20	41	58	64	82	86	92	94	100	96	100
7	Regards momentarily				20	31	59	39	6	.	.	.	.	.	.	.
8	Regards recurrently				15	11	27	25	15	0	9	11	18	14	11	15
9	Regards prolongedly				10	13	27	33	18	11	0	3	.	.	.	.
10	Regards consistently								22	73	94	94	95	97	97	100
11	Regards passively				15	29	65	11	3	.	.	.	.	.	.	.
12	Regards surroundings				45	36	12	11	9	3	6	5	3	0	9	.
13	Regards Examiner				50	25	12	19	3	18	3	5	29	33	21	11
14	Regards Examiner's hand				80	68	38	47	15	15	9	5	24	11	.	.
15	Regards table top				55	40	24	8	3	3	.	.	.	.	.	.
16	Regards hand				40	56	18	14	9	3	0	0	3	.	.	.
17	Fingers table top near pellet							6	39	24	11	3	3	.	.	.
18	Approaches				10	9	27	83	91	100	100	100	100	100	98	100
19	Approaches promptly							4	3	45	73	85	86	86	94	92
20	Approaches with one hand				0	9	11	53	67	85	91	95	94	100	98	93
21	Places hand over pellet							.	28	64	38	29	19	4	19	9
22	Approaches with index finger extended							3	5	18	29	32	60	44	14	17
23	Dislodges on contact				0	7	24	33	36	27	20	8	6	3	2	.
24	Contacts				5	27	27	58	91	100	100	100	100	100	98	100
25	Hand flexes on pellet							0	19	64	76	97	100	100	98	100
26	Hand flexes, thumb participates							0	5	21	53	80	84	94	97	98
27	Flexes fingers on or near pellet							0	8	33	76	91	72	62	32	25
28	Flexes fing. on or near P., thu not particip							0	8	33	64	59	32	19	23	12
29	Flexes fingers on or near pel, thumb op fin								0	12	37	26	16	15	—	—
30	Thumb and index finger meet								5	9	35	72	81	91	97	98
31	Flexes fingers, thumb and index meet								5	9	29	37	33	29	25	19
32	Flexes thumb and index finger independ.								0	3	12	37	57	59	72	79
33	Rt. fin. th. meets in. and sec fins., or sec fin								0	0	6	17	16	24	14	15
34	Hand flexes without grasp							0	8	16	58	82	60	54	35	19
35	Manipulates pellet on table top							12	21	45	61	44	52	57	24	14
36	Pokes									6	3	11	35	6	6	8
37	Grasps							0	0	0	30	59	72	100	94	100
38	Grasps promptly											25	38	38	70	77
39	Grasps with fingers										27	56	52	51	32	25
40	Grasps with finger flexion, thumb not par.										21	14	16	.	.	.
41	Grasps with finger and thumb flexion										6	15	14	8	9	0
42	Grasps, thumb participates										15	41	66	81	85	97
43	Grasps between thumb and index finger										9	24	52	76	71	81
44	Grasps, thu-index meeting, fingers flexing										21	29	30	29	25	19
45	Grasps with inde. thu -index finger flexion										9	6	29	51	53	79
46	Plucks											3	3	18	25	28
47	Brings to mouth										3	6	20	16	47	42
48	Manipulates pellet above table top										9	22	38	42	28	33
49	Brings pellet to platform										17	11	24	11	9	7
50	Drops										21	47	46	30	44	36
51	(If grasped) drops										70	80	63	30	46	36
52	(If drops) drops immediately										100	57	20	26	6	8
53	(If drops) resecures from table top										29	23	60	66	62	100
54	Retains pellet											12	32	38	68	70
55	Releases and resecures pellet												11	24	28	26
56	Vocalizes							15	9	6	14	6	11	10	7	4
57	Frets							5	9	31	28	15	22	3	4	7
58	Postural activity											14	24	25	26	37

PELLET

Item

- P 1-9 Regard prior to approach.
 7 See definition of *momentary* in glossary.
 9 Any regard mentioned as prolonged or over five seconds in length. This does not include more mature sustained regard but rather implies a starey regard.
 11 Regard which is directed to the pellet but which is not accompanied by any overt response to it.
 24 It will be noted that at 16 weeks 19 per cent of the cases did not approach the pellet which indicates that in the majority of instances the child did not regard the pellet during the contacting movement.
 25 Includes scratches and rakes but differs from scratches and rakes in that there may be some cases in which the flexion is not repeated.
 34 Any unsuccessful hand closure at any time, which may be followed by eventual prehension of the pellet.
 35 Includes hitting, pushing, pulling, dragging, poking.
 48 Includes transferring, twiddling, and holding aloft with or without regard.
 58 Pivoting, turning, pulling to side rail, creeping, or standing.

Atlas Delineations

- P 5 (If regards) regards after delay: 16 weeks, p. 381, C
 7 Regards momentarily. 20 weeks, p. 383, B
 13 Regards Examiner: 12 weeks, p. 379, C, D
 14 Regards Examiner's hand: 16 weeks, p. 381, B
 16 Regards hand: 16 weeks, p. 381, D
 18 Approaches: 24 weeks, p. 386, D
 22 Approaches with index finger extended: 40 weeks, p. 402, A
 24 Contacts pellet: 28 weeks, p. 390, B (see text)
 26 Hand flexes, thumb participates: 32 weeks, p. 395, G
 27 Flexes fingers on or near pellet: 28 weeks, p. 390, B
 31 Flexes fingers, thumb and index meet: 36 weeks, p. 399, E
 34 Hand flexes without grasp: 28 weeks, p. 390, B
 36 Pokes pellet: 40 weeks, pp. 402-3, C, E, F, H
 37 Grasps pellet: 32 weeks, p. 395, G
 45 Grasps with independent thumb-index finger flexion: 44 weeks, p. 406, A-C
 46 Plucks pellet: 52 weeks, p. 411, C
 48 Manipulates pellet above table top: 48 weeks, p. 409, C, D
 50 Drops: 32 weeks, p. 395, H

§ 19. PELLET AND BOTTLE BEHAVIOR (32 weeks-56 weeks)

SITUATION: PELLET AND BOTTLE (P-Bo)

P-Bo	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56	
PELLET IN BOTTLE																	
1	Regards pellet as dropped in bottle									31	33	80	82	83	75	23	
2	Regards pellet in bottle									12	26	37	67	69	78	96	
3	Attends predominantly to bottle									90	88	65	53	24	22	16	
4	Attends predominantly to pellet									10	12	24	36	53	78	84	
5	Attends simul. to pellet and bottle									0	11	11	23	0	0		
6	Manipulates bottle on table top									44	56	57	33	41	32	12	
7	Bangs or hits bottle on table top									31	30	30	22	38	19	4	
8	Brings bottle to mouth									69	67	60	45	45	35	19	
9	Manipulates bottle above table top									50	85	83	82	97	92	96	
10	Rotates bottle									19	33	30	37	31	25	8	
11	Turns bottle upside down									12	19	37	22	41	49	19	
12	Turns bottle over									19	30	10	22	21	36	54	
13	Waves or shakes bottle									·	7	23	22	37	37	27	
14	Pokes at pellet									12	15	27	33	52	50	54	
15	Pokes finger in bottle									·	11	7	19	17	25	31	
16	Pellet falls out of bottle									56	59	77	82	83	95	77	
17	Apparently adapts manip so pellet drops out									0	14	21	42	48	56	78	
PELLET DROPPED FROM BOTTLE																	
18	Manipulates bottle as before									77	81	65	22	29	22	5	
19	Attends to bottle only									66	56	43	31	20	18	0	
20	Perceives disappear. of pellet from bottle									·	25	30	45	63	68	75	
21	Regards pellet after dropped from bottle									·	44	44	69	82	83	79	90
22	Pursues pellet									11	31	35	68	75	73	90	
23	Grasps pellet									·	19	30	45	54	68	70	
24	Manipulates pellet above table top									·	·	13	0	38	41	55	
25	Combines pellet and bottle									·	·	9	8	37	41	55	
26	Brings pellet to bottle									·	·	9	0	20	37	50	
27	Places pellet in bottle									·	·	4	7	19	12	26	
28	Turns to side, pivots or creeps									·	·	28	28	12	15		
PELLET BESIDE BOTTLE																	
29	Holds pellet over bottle												6	35	63	63	
30	Releases pellet over top of bottle												6	35	47	54	

PELLET AND BOTTLE

Item

- P-Bo 6 The activity includes hitting, banging, pushing, rolling, or rubbing. At 32 weeks the bottle is likely to be hit on the table; at 36 weeks, hit or rolled, at 40 weeks, brushed, rolled, or banged, and at 48 weeks, hit with vigor or thrown against the table.
- 17 The infant handles the bottle in such a manner that the pellet is caused to drop out. The bottle need not be turned over, it may be shaken, but there must be some evidence in the child's attention which suggests that the act is purposeful.
- 20 The infant gives evidence, by change in regard or manipulatory behavior, that he has noted the disappearance of the pellet from the bottle.
- 30 When the pellet sticks to the hand, but the fingers go through the motion of releasing the pellet, this item has been checked as present.

Atlas Delineations

- P-Bo 3 Attends predominantly to bottle: 40 weeks, p. 420, A-B (see text)
- 4 Attends predominantly to pellet: 44 weeks, p. 424, A-D (normative at 48 weeks)
- 11 Turns bottle upside down: 52 weeks, p. 432, C (see text, inverts)
- 17 Apparently adapts manipulation so pellet falls out: 44 weeks, p. 424, C (normative at 52 weeks)
- 18 Manipulates bottle as before: 40 weeks, p. 420, B (see text)
- 21 Regards pellet after dropped from bottle: 40 weeks, p. 420, C
- 29 Holds pellet over bottle: 48 weeks, p. 429, D (normative at 52 weeks)

§ 20. PERFORMANCE BOX BEHAVIOR (40 weeks-56 weeks)
SITUATION PERFORMANCE BOX (PfB)

PfB	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
PERFORMANCE BOX ALONE																
1	Places hands on box											77	92	61	62	71
2	Prior manipulation of box											54	54	22	34	30
3	Manipulates box exclusively											19	38	13	19	13
4	Reaches to top of box											62	67	48	28	70
5	Manipulates box near holes											69	50	78	69	79
6	Prior manipulation of holes											42	38	70	56	65
7	Manipulates holes exclusively											19	20	26	44	30
8	Pokes in holes											31	42	74	66	65
9	Manipulates both box and holes											58	42	52	34	57
ROD PRESENTED																
10	Manipulates rod											52	42	30	19	36
11	Transfers rod											32	27	15	5	16
12	Brings rod to box surface or holes											64	65	74	81	88
13	Brings rod to box surface											44	46	26	16	16
14	Brings rod to right or left hole											0	15	33	43	64
15	Brings rod to middle hole											4	15	19	35	60
16	Rubs rod against box											20	35	15	19	4
17	Inserts rod in hole											0	19	56	60	72
18	Inserts rod in middle hole											0	0	0	33	40
19	Inserts rod, never releases											0	19	56	38	40
20	Releases rod in hole											0	0	0	21	32
INSERTION DEMONSTRATED																
21	Pursues rod as Examiner inserts											19	23	35	22	43
22	Manipulates box											50	62	65	40	43
23	Pokes holes											42	42	50	40	43
24	Manipulates and mouths rod											54	50	42	28	33
25	Drops rod without relation to box											23	31	8	12	35
26	Brings rod to box											65	73	92	97	95
27	Brings rod to box surface only											42	54	54	33	10
28	Brings rod to box and releases											0	27	35	67	74
29	Brings rod to vicinity of holes only											12	19	35	51	29
30	Brings rod to box on repeated demonstra.											33	35	67	79	75
31	Hits rod on box											27	19	0	0	8
32	Rubs rod against box surface											19	31	42	30	5
33	Inserts rod in hole											0	38	58	76	86
34	Inserts rod without ever releasing											0	38	46	38	24
35	Inserts rod in middle hole											0	8	35	55	71
36	Releases rod in hole											0	0	12	39	62
37	Releases rod in middle hole											0	0	4	26	52
38	Releases rod into box											0	0	12	30	52
39	Activity with right or left hole											4	15	30	57	67
40	Activity with middle hole											0	15	42	58	86
41	Evidence of induced behavior											27	42	38	58	67
42	Postural activity											8	23	30	26	48

*Item***PERFORMANCE BOX**

- Pf-B 2 Manipulates first the box as a whole rather than the holes of the box.
 10 Includes turning, transferring, and mouthing.
 20 The rod does not necessarily fall into the box.
 22 Includes manipulation of the holes of the box but excludes any activity of the rod with the holes or any activity with the rod alone.
 23 This activity frequently is pursuing the rod in the hole with fingers as the Examiner releases the rod.
 29 Excludes any insertion of the rod in the hole.
 41 Induced behavior consists of, combining after demonstration only, improvement in method, improvement of orientation of rod, and releasing of rod in correct hole.
 42 Pivots, kneels, creeps, or stands

Atlas Delineations

- Pf-B 2 Prior manipulation of box: 40 weeks, p 507, c
 4 Reaches to top of box 40 weeks, p 507, a, 44 weeks, p 507, b
 6 Prior manipulation of holes: 48 weeks, p 509, a
 23 Pokes holes: 40 weeks, p. 507, d-e

§ 21. PRONE BEHAVIOR (4 weeks–56 weeks)

SITUATION: PRONE (Pr)

Pr	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	(Ventral suspension) head compensates .	19	69	67	80	100	.	.	.	.	.	.	.	.	.	.
2	(Placement) head rotates .	53	52	44	12	9	.	.	.	.	.	.	.	.	.	.
3	(Placement) head in mid position .	47	48	56	88	89	87	97	96	100	.	.	.	.	.	.
4	Lifts head momentarily .	63	75	57	25	25	19	.	.	.	.	.	.	.	.	.
5	Holds head lifted sustainedly .	23	39	54	71	73	83	82	87	.	.	.	.	.	.	.
6	Lifts head to Zone 1 .	88	100	89	100	100	100	.	.	.	.	.	.	.	.	.
7	Lifts head to Zone 2 .	47	86	79	81	93	87	97	96	100	.	.	.	.	.	.
8	Lifts head to Zone 3 .	3	10	14	46	54	81	97	90	100	.	.	.	.	.	.
9	Lifts head to Zone 4 .	0	0	0	0	0	0	23	28	61	69	100	.	.	.	.
10	Raises upper chest .	3	14	36	43	68	72	86	81	96	100	100	.	.	.	.
11	Arms flexed .	100	100	100	100	88	83	65	67	14	10	.	.	.	.	.
12	Arms flexed, close to chest .	67	100	60	50	26	35	3	.	.	.	.	.	.	.	.
13	Arms extended .	0	0	4	8	16	50	74	56	80	90	.	.	.	.	.
14	Lifts hand .	31	16	21	8	57	.	.	.	.	.	.	.	.	.	.
15	Lifts arm and hand .	.	.	.	.	8	12	26	36	21	23	20	.	.	.	.
16	Scratches platform .	6	24	21	20	13	54	20	11	—	—	7	.	.	.	.
17	Legs flexed and adducted (kneels) .	94	82	71	15	8	0	.	.	.	.	.	.	.	.	.
18	Hips raised .	100	82	85	69	29	17	.	.	.	.	.	.	.	.	.
19	Legs flexed, outwardly rotated .	3	24	46	57	37	28	32	0	7	7	3	.	.	.	.
20	Legs flexed only at knees .	19	24	11	23	53	66	52	58	24	30	10	7	4	3	3
21	Legs extended or semiextended .	44	69	50	85	74	75	68	55	45	40	20	7	4	3	3
22	Legs extended .	.	.	.	.	54	41	45	26	41	33	10	7	4	3	3
23	Rests on forearms .	6	24	57	67	82	72	35	24	7	4	4	—	.	.	.
24	Rests on hands .	3	0	0	4	16	32	65	67	93	96	96	100	—	.	.
25	Rests only on knees, abdomen, chest, head .	92	73	50	10	14	5	.	.	.	.	.	.	.	.	.
26	Rests only on knees, abd , chest, forearms .	8	24	46	53	19	.	.	.	.	.	.	.	.	.	.
27	Rests only on thighs, abd , chest, forearms .	0	4	21	26	70	62	39	42	10	7	7	11	—	3	3
28	Rests only momentarily on abd and chest .	8	4	11	10	17	38	16	23	17	7	.	.	.	.	.
29	Rests only on thighs, abd , chest, hands .	.	.	.	.	4	13	52	71	62	73	60	41	35	33	40
30	Rests only on thighs, lower abd., hands .	0	0	0	0	4	13	6	38	28	48	32	38	15	—	.
31	Assumes creeping position .	.	.	.	.	—	9	7	7	17	23	43	63	73	77	80
32	Assumes quadrupedal position .	.	.	.	.	—	—	—	—	10	3	3	26	15	18	7
33	Rolls to side or supine .	6	7	4	8	13	26	40	30	29	35	32	14	.	.	.
34	Rolls to side only .	6	7	0	8	10	9	19	14	4	3	16	4	.	.	.
35	Rolls to supine .	0	3	4	0	4	17	21	11	25	37	23	14	0	.	.
36	Flexes legs in crawling movements .	84	79	64	19	13	3	6	3	—	—	.	.	.	.	.
37	Flexes leg drawing up knee .	.	.	.	.	0	0	23	23	35	37	57	59	77	83	87
38	Pivots .	13	13	46	24	19	20	33	34	60	70	77	95	96	97	.
39	Regresses .	0	3	0	0	4	3	—	—	3	7	28	5	.	.	.
40	Progresses .	13	17	4	4	2	0	0	0	17	17	40	54	81	87	100
41	Crawls .	.	.	.	.	—	—	—	—	0	3	17	7	13	3	.
42	Creeps .	.	.	.	.	—	—	—	—	17	17	30	46	65	80	80
43	Attains supine or sitting .	0	3	4	0	4	17	21	11	27	30	57	68	83	94	83
44	Pushes upward and backward to sitting .	.	.	.	.	..	.	.	3	3	30	57	63	94	.	.

PRONE

Item

- Pr 1 Head held in line with body or raised from the horizontal, even if only briefly.
 2 When the child is placed on the platform, he turns the head to the side.
 4 A child may lift his head momentarily and then later hold it lifted sustainedly in which case the child would be checked for both items.
 5 The head is held lifted more than momentarily or prolongedely, and although it need not be the entire situation the item implies that the head was raised more than it was lowered.
 6-9 See Glossary illustration, page 277.

Item

- Pr. 10 Includes also raising the lower chest At the earlier age levels at least half the cases raise only the upper chest
 11 The infant's predominating posture in the prone position
 14 Includes extending the arm toward the lure The elbow need not be raised from the platform
 15 The elbow as well as the forearm is raised from the platform
 19 The legs are in a frog-like posture.
 31 Creeping position means that the body is raised from the platform and the child supports himself on hands and knees This position is assumed to be present for all children who creep but excludes those who crawl forward without lifting the body.
 34 At 24 weeks this represents an activity in itself, while at 40 weeks the rolling to the side is a step in the achievement of the sitting position The child rolls to the side and then pushes with his arm to sitting
 36 At any time during the situation one or both legs are active and are drawn up and then extended
 37 Excludes crawling movements and is checked only for those cases where the weight is resting on the knees, abdomen, and forearm
 38 The rise in percentages at 8 weeks is associated with raising the head sustainedly and crawling movement of the legs. The combined behaviors are likely to produce pivoting
 39 The child, straining with the arms, pushes himself backward instead of forward in an obvious effort to progress
 40 Includes creeping, crawling, hitching, and any other method of translocation but excludes mere pivoting.

Atlas Delineations

- Pr 1 (Ventral suspension) Head compensates 6 weeks, p 96, A, 8 weeks, p 100, A; 12 weeks, p. 104, A
 2 (Placement) Head rotates: 4 weeks, p 92, C-D, 6 weeks, p 96, C-D
 3 (Placement) Head in mid position: 12 weeks, p 104, B, C
 4 Lifts head momentarily 6 weeks, pp. 96-7, A (1 1/2 sec.) (see text), C (1 sec.), E-H (3 1/2 sec.)
 5 Holds head lifted sustainedly: 8 weeks, p. 101, E-H (21 sec. +)
 6 Lifts head to Zone 1 6 weeks, p 96, C; 8 weeks, pp 100-1, C, E, 12 weeks, p. 105, E, G, 16 weeks, p 107, D
 7 Lifts head to Zone 2: 6 weeks, p 97, G; 8 weeks, p. 101, G, H; 12 weeks, p. 105, F-H; 16 weeks, p 107, C
 8 Lifts head to Zone 3: 16 weeks, p 107, A, B, 20 weeks, pp. 110-11, A, E, H
 9 Lifts head to Zone 4: 28 weeks, p. 117, B
 10 Raises upper chest: 12 weeks, p. 104, B, 20 weeks, p. 110, A-B
 11 Arms flexed: 12 weeks, pp. 104-5, B-H, 16 weeks, p. 107, A, C-D, 20 weeks, p. 110, C
 12 Arms flexed, close to chest: 4 weeks, p. 92, B-H; 8 weeks, pp 100-1, C-H
 13 Arms extended: 24 weeks, p. 115, E (normative at 20 weeks but with body oriented as on p 111, G)
 15 Lifts arm and hand. 28 weeks, p. 117, C
 16 Scratches platform 20 weeks, pp 110-11, D, E, F, G (note prescratching behavior 16 weeks, p 107, C)
 17 Legs flexed and adducted (kneels): 4 weeks, pp 92-3, D, F-G
 18 Hips raised: 4 weeks, pp. 92-3, C-H; 6 weeks, pp. 96-7, CD; 8 weeks, pp 100-1, C, E-H
 19 Legs flexed, outwardly rotated: 8 weeks, p. 101, F-H (more characteristic of 12 weeks); 16 weeks, p. 107, C; 20 weeks, pp. 110-1, A-H
 20 Legs flexed only at knees. 24 weeks, pp 114-5, A-B, G-H
 21 Legs extended or semi-extended: 6 weeks, pp. 96-7, B, F; 8 weeks, p. 100, D; 12 weeks, pp. 104-5, B, D-H; 16 weeks, p 107, B-D
 23 Rests on forearms: 8 weeks, p. 101, E-H; 12 weeks, pp. 104-5, B, D-H; 16 weeks, p 107, A-D, 20 weeks, pp 110-1, A-H
 24 Rests on hands: 24 weeks, p. 115, E
 25 Rests only on knees, abdomen, chest, head: 4 weeks, p 93, D, F-G
 26 Rests only on knees, abdomen, chest, forearms: 6 weeks, p. 96, C; 8 weeks, pp. 100-1, C, E
 27 Rests only on thighs, abdomen, chest, forearms: 16 weeks, p. 107, A-D; 20 weeks, pp. 110-1, C, E-G
 28 Rests momentarily only on abdomen and chest: 32 weeks, p. 120, B (characteristic of 20 weeks in different posture pattern however)
 29 Rests only on thigh, abdomen, chest, hands: 24 weeks, p 115, E
 30 Rests only on thighs, lower abdomen, hands: 36 weeks (32), p 124, B
 31 Assumes creeping position: 40 weeks (36), p. 128, B; 44 weeks (40), pp. 132-3, C-F
 32 Assumes quadrupedal position: 52 weeks (48), pp. 140-1, A-C, H (characteristic of 44 weeks); 60 weeks (56), p 144, A
 34 Rolls to side only: 24 weeks, p. 114, D
 36 Flexes legs in crawling movements: 4 weeks, p. 93, E-H; 6 weeks, p 97, E-H
 37 Flexes leg drawing up knee: 6 weeks, p. 97, E-G. (Not noted until precrawling age) 36 weeks, p. 125, E, F, H (normative at 40 weeks)
 38 Pivots: 32 weeks, pp. 120-1, A-H. (Note arms principally used) 36 weeks (32), pp. 124-5, D-H
 39 Regresses: 36 weeks, p. 124, B
 40 Progresses: 40 weeks (36), p. 129, E-H (normative at 44 weeks)
 42 Creeps: 44 weeks (40), pp 132-3, A-F (normative at 48 weeks); 48 weeks, pp 136-7, B-E
 44 Pushes upward and backward to sitting: 44 weeks (40), p. 133, G-H, 48 weeks, p. 137, F-H

§ 22. RATTLE BEHAVIOR (4 weeks-28 weeks)

SITUATION: RATTLE (Ra)

RA	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Does not regard	41	24	22	8	4										
2	(If r) r only in line of vis or when shaken	70	68	67	68	28										
3	Regards after delay	43	48	54	72	35	24	21	6							
4	(If regards) regards after delay	77	72	78	72	41										
5	Reg in midplane (spon or after shaken)	46	44	35	62	95										
6	Regards in midplane (lg h)	16	16	14	16	100										
7	Regards in midplane (rd h)	56	56	40	80	94										
8	Regards spontaneously in midplane	29	31	33	32	69	76	79	94							
9	Regards only momentarily	50	59	54	46	46	21	13	6							
10	Regards starily	3	11	11	42	64	3	6	0							
11	Regards consistently	0	0	0	0	11	35	58	88							
12	Regards surroundings	59	67	78	57	25	29	15	28							
13	Regards Examiner	35	58	54	96	58	57	61	61							
14	Regards hand	0	8	0	23	11	23	15								
15	Regards rattle in hand	10	24	14	35	45	79	93	100							
16	(Contact) hand clenches	60	65	48	46	0										
17	(Contact) arm becomes active	50	54	59	27	7										
18	(Contact) hand opens	65	58	89	83	79	93	100	100							
19	(Contact) hand opens immediately	43	31	61	75	80										
20	Near hand grasps rattle	0	0	0	6	25	70	87	94							
21	(In hand) holds actively	45	60	52	78	77										
22	(In hand) holds passively	90	68	87	61	38										
23	Arm increases activity	0	0	14	30	53	94	90	100							
24	Approaches	0	0	11	12	29	90	83	100							
25	Approaches after delay	0	0	0	4	20	24	29	10							
26	Approaches promptly	0	0	0	0	6	43	50	88							
27	Approaches with both hands	0	0	0	5	22	61	53	50							
28	Approaches with one hand	0	0	5	9	15	39	40	62							
29	Hands close on each other	0	0	0	5	14	18	7	0							
30	Hands to mouth	0	0	0	9	27	15	7	0							
31	Contacts rattle	0	0	7	4	15	56	61	94							
32	Grasps	0	0	0	0	0	47	61	94							
33	Grasps after delay	0	0	0	0	0	35	45	19							
34	Manipulates holding by bowl	0	0	0	0	0										
35	Retains ent. per. (placed in r or l hand)	45	63	42	75	54										
36	Retains entire period (placed in left hand)	37	33	37	47	37	35	31	65							
37	Opens and closes hand	45	36	27	33	35	17	18	9							
38	Brings rattle to mouth	30	28	22	39	59	64	73	78							
39	Waves or shakes rattle	0	0	0	0	16	33	38	32							
40	Brings free hand toward midplane	10	12	5	44	50										
41	Free hand contacts rattle	10	8	5	22	29	56	85	78							
42	Free hand fingers rattle	5	0	0	17	11	17	42	22							
43	Grasps with free hand	0	0	0	0	3	42	40	50							
44	Transfers	0	0	0	0	0	25	40	50							
45	Drops	100	92	84	69	64	70	62	18							
46	Drops immediately	70	46	58	31	23	12	6	0							
47	If drops, responds to loss	29	25	13	25	60										
48	If drops, regards after losing	5	0	0	0	17	42	50	18							
49	If drops, strains toward lost rattle	0	0	0	0	11	36	52								
50	If drops, resecures rattle	0	0	0	0	5	20	43	50							
51	Rolls to side	3	0	7	4	42	62	68	60							
52	Frets	33	14	7	15	27	16	18	45							
53	Vocalizes	23	36	21	38	22	41	44	25							

Note: Placed in both hands up to 16 weeks, 15 cases only

RATTLE

At the early age levels, 4 through 12 weeks, the rattle was placed in both hands, after 12 weeks it was placed in the left hand. It will be remembered that this procedure was introduced because at the earlier ages the child lies with the head turned to the side and the regard for an object in the face hand is naturally favored

Item

- Ra 1 Disregard for the rattle is to be regarded as a result of inattention rather than faulty vision
 1, 3, }
 4, 5, } Refer to the regard for the rattle either before approach or before it is placed in the child's hand
 6, 7, }
 8, 9, }
 10 }
 11-14 At any time during the situation.
 18 This response is sometimes slightly delayed.
 20 It is implied that the hand definitely opens when the rattle is near it, remains open, and closes on the rattle as soon as it is within grasp.
 21, 22 When the rattle is grasped firmly in the hand, the holding has been called *active* and, when it is held loosely with the fingers partially extended, *passive holding*. Even with the passive holding, the rattle may be retained during slight activity of the arm.
 23 The first regard for the rattle is accompanied by a definite increase in the rate or the extent of arm activity.
 30 The regard for the rattle seems occasionally to initiate medially directed arm movements which terminate at the mouth.
 39 Excludes merely retaining the rattle with arm movement when unaccompanied by blinking, general animation of the face, or by regard for the rattle as the rattle is moved.
 47 This response may be a start, fussing or crying, regard for the rattle, or straining toward it.

Atlas Delineations

- Ra 1 Does not regard: 4 weeks, p. 264, A, B
 2 (If r) r only in line of vis or when shaken: 6 weeks, p. 267, B; 8 weeks, p. 269, A 1 25 sec
 5 Regards in midplane (spontaneously or after shaken) 12 weeks, p. 271, A (normative at 16 weeks), 16 weeks, p. 274, A
 8 Regards spontaneously in midplane: 12 weeks, p. 271, A (normative at 16 weeks)
 15 Regards rattle in hand: 16 weeks, p. 275, G (normative at 20 weeks), 20 weeks, p. 279, E, F
 17 (Contact) arm becomes active: 4 weeks, p. 264, C-D
 18 (Contact) hand opens: 4 weeks, p. 265, F, 8 weeks, p. 269, B; 12 weeks, p. 271, C
 21 (In hand) holds actively: 6 weeks, p. 267, C, D; 8 weeks, p. 269, D
 23 Arm increases activity: 16 weeks, p. 274, A-D
 24 Approaches: 20 weeks, p. 278, B-D
 27 Approaches with both hands. 20 weeks, p. 278, B-D
 28 Approaches with one hand: 24 weeks, p. 281, B (normative at 28 weeks)
 29 Hands close on each other: 16 weeks, p. 275, E; 20 weeks, p. 278, B
 30 Hand to mouth: 16 weeks, p. 275, F
 32 Grasps: 20 weeks, p. 278, D (normative at 24 weeks)
 38 Brings rattle to mouth: 20 weeks, p. 279, G (normative at 16 weeks)
 42 Free hand fingers rattle. 24 weeks, p. 281, C
 44 Transfers. 28 weeks, p. 283, D
 46 Drops immediately: 4 weeks, p. 265, H
 48 If drops, regards after losing: 24 weeks, p. 281, D (rattle placed within reach on platform)
 49 If drops, strains toward lost rattle: 24 weeks, p. 281, D (rattle placed within reach on platform)
 51 Rolls to side: 24 weeks, p. 281, C (normative at 20 weeks)
 52 Frets: 4 weeks, p. 265, E-H

§ 23. DANGLING RING BEHAVIOR (4 weeks-28 weeks)

SITUATION: DANGLING RING (RD)

RD	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards after delay . . .	77	54	64	65	27	13	14	5							
2	Regards immediately . . .	26	46	36	35	68	97	96	95							
3	Regards momentarily . . .	53	85	71	38	35										
4	Regards prolongedly . . .	47	43	29	62	87	47	38	5							
5	Regards consistently . . .					17	26	59	90							
6	Disregards in midplane . . .	77	39	46	46	14										
7	Regards in midplane . . .	29	61	54	54	86										
8	Regards in midplane (long head) . . .	22	25	12	50	83										
9	Regards in midplane (round head) . . .	32	75	70	56	88										
10	Regards ring in hand . . .					66	82	100	100							
11	Regards string . . .						7	13	46	53						
12	Shifts regard . . .	94	100	100	96	93	46	38	41							
13	Shifts regard to surroundings . . .	75	68	61	35	13	16	14	5							
14	Shifts regard to Examiner's hand . . .	28	64	61	77	48										
15	Shifts regard to Examiner . . .	41	54	57	65	64	27	24	27							
16	Shifts regard to hand . . .	0	4	7	8	19	5	3								
17	Follows past midplane . . .	44	62	50	58	84										
18	Follows past midplane (lg h) . . .	20	33	25	37	83										
19	Follows past midplane (rd h) . . .	55	75	60	67	77										
20	Follows approximately 180° . . .	16	43	46	50	68										
21	Follows approximately 180° (lg h) . . .	0	11	25	25	83										
22	Follows approximately 180° (rd h) . . .	36	55	55	61	62										
23	Approaches . . .	0	0	11	12	62	89	96	100							
24	Approaches after delay . . .						58	30	19	9						
25	Approaches promptly . . .						32	66	81	91						
26	Arms increase activity . . .	0	4	11	42	64										
27	Arms separate . . .	0	0	4	15	17	19	7								
28	Approaches with one hand . . .	0	0	4	12	20	24	39	55							
29	Approaches with both hands . . .	0	0	0	0	50	76	82	77							
30	Approaches with arms flexed . . .	0	0	0	12	44	60	54	14							
31	Hands come together . . .	0	0	0	8	20	38	11	5							
32	Contacts ring . . .	3	4	4	15	43	81	100	100							
33	Dislodges ring on contact . . .	3	4	4	8	20	35	28	5							
34	Grasps . . .	0	0	0	8	22	73	96	100							
35	Grasps after delay if grasps . . .						75	46	14							
36	Grasps interdigitally . . .							61	45	7						
37	Retains entire period . . .						20	19	40	65						
38	Holds with both hands . . .						10	33	56	67						
39	Hand opens and closes on ring . . .						30	11	10	14						
40	Brings ring to mouth . . .						38	58	82	74						
41	Free hand to midplane . . .						25	51	56	84						
42	Transfers . . .						3	18	41	74						
43	Drops . . .						78	56	41	32						
44	Drops immediately . . .						42	32	7	0						
45	Regards dropped ring if drops . . .						10	37	43	100						
46	(If drops) pursues dropped ring . . .						7	16	29	100						
47	(If drops) resecures dropped ring . . .						7	5	29	60						
48	Rolls to side . . .	3	4	8	4	35	42	38	18							
49	Frets . . .	9	14	4	8	27	23	32	21							

DANGLING RING

The Dangling Ring situation at 4 through 12 weeks differs significantly from the situation at 16 to 52 weeks. At the former age levels following of the ring is elicited while at the latter age levels the ring is held in the midplane for observation of regard, prehension and other adaptive behavior. This fact should be kept in mind when the percentages are inspected.

Item

- RD 2, 3, 4,] Apply only to the character of the regard before either approach or grasp or until the ring has
 14, 16,) been put in the hand
 5 Applies to the duration of the situation.
 23 Excludes mere drawing apart of the hands. If, however, the hands draw apart and approach the ring, the item is credited
 27 When the child is lying with his hands either resting on the chest or flexed at the elbow, directed toward the midplane, on the presentation of the rattle the arms are sometimes seen to abduct and externally rotate. This is designated as "arms separate"
 28, 29 It should be noted that if the ring was immediately dropped, it was re-presented. The child might therefore approach with one hand on one presentation and with both hands on another presentation, consequently the combined percentages do not add up to one hundred as might be expected
 31 Hands come together. It not infrequently happens that the hands instead of closing on the ring, come together at the midline either through the ring or more usually not reaching as far as the ring
 38 Does not include transfers the ring from one hand to the other but only when the ring is held for a period with both hands. Transfer may, of course, take place later
 39 If the ring has been placed in the hand, the fingers of the hand may alternately extend and flex without dropping the ring.
 40 Because of the size and shape of the ring it is not readily brought actually to the mouth, the hand may be brought in contact with the mouth, or the ring may be brought to the chin with subsequent mouthing movements. Such behavior is included in this item.
 46, 47 Visual pursuit not counted; item implies actual approach

Atlas Delineations

- RD 1 Regards after delay: 8 weeks, p. 247, B; 12 weeks, p. 249, A
 2 Regards immediately: 16 weeks, p. 251, A
 3 Regards momentarily: 4 weeks, p. 243, B-C (3 sec.)
 4 Regards prolongedly 12 weeks, p. 249, A-B (6 sec)
 6 Disregards in midplane: 4 weeks, p. 243, A
 7 Regards in midplane 8 weeks, p. 247, B (normative at 6 weeks)
 10 Regards ring in hand: 16 weeks, p. 251, D
 11 Regards string: 28 weeks, p. 261, H
 14 Shifts regard to Examiner's hand: 8 weeks, p. 247, B (see text); 12 weeks, p. 249, B (see text)
 17 Follows past midplane: 8 weeks, p. 247, C-D (normative at 6 weeks)
 20 Follows approximately 180°: 12 weeks, p. 249, C-D
 23 Approaches: 16 weeks, p. 251, B-C
 27 Arms separate: 20 weeks, p. 254, B-D
 28 Approaches with one hand: 24 weeks, p. 257, A (normative at 28 weeks); 28 weeks, p. 260, A
 29 Approaches with both hands: 16 weeks, p. 251, B
 30 Approaches with arms flexed. 20 weeks, p. 255, E
 31 Hands come together: 16 weeks, p. 251, C (characteristic at 20 weeks); 20 weeks, p. 254, C
 34 Grasps: 20 weeks, p. 255, F
 35 If grasps, grasps after delay: 20 weeks, p. 255, F
 38 Holds with both hands: 28 weeks, pp. 260-1, D-G
 40 Brings ring to mouth. 24 weeks, p. 257, C; 28 weeks, p. 261, E, G (normative at 20 weeks)
 41 Free hand to midplane: 20 weeks, p. 255, G
 43 Drops: 20 weeks, p. 255, H

§ 24. RING AND STRING BEHAVIOR (28 weeks-56 weeks)

SITUATION RING AND STRING (R-S)

R-S	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards ring								100	94	85	97	94	94	100	95
2	Regards ring first	.	.	.	.	.	.	.	89	68	65	69	77	81	79	84
3	Regards string	.	.	.	.	.	.	.	71	90	88	83	74	61	76	74
4	Regards string first (regard before appr)	.	.	.	.	.	.	.	11	32	35	28	23	19	17	21
5	Shifts fr from ring to str or ring-str-ring	.	.	.	.	.	.	.	54	58	53	64	55	52	55	58
6	Approaches ring	.	.	.	.	.	.	.	54	28	26	8	6	6	5	8
7	Approaches ring first	.	.	.	.	.	.	.	50	28	26	5	6	—	5	8
8	Approaches string	.	.	.	.	.	.	.	50	81	92	97	94	97	100	100
9	Approaches string first	.	.	.	.	.	.	.	43	69	83	95	94	97	100	92
10	Contacts string before ring	.	.	.	.	.	.	.	46	75	92	95	97	95	100	100
11	Grasps string	.	.	.	.	.	.	.	18	53	83	92	91	92	100	92
12	Hand closes on string ineffectively (If hand closes on string) grasps ineffect.	.	.	.	.	.	.	.	21	41	32	27	24	—	8	8
13		.	.	.	.	.	.	.	55	71	53	46	36	25	11	8
14	Grasps string immediately	.	.	.	.	.	.	.	0	16	32	65	67	89	90	83
15	Pulls or drags string in	.	.	.	.	.	.	.	29	53	83	95	94	95	97	96
16	Regards str only as reaches and pulls str	.	.	.	.	.	.	.	4	16	23	5	15	8	3	17
17	Regards ring as approaches and pulls string	.	.	.	.	.	.	.	18	34	60	87	82	78	74	50
18	Regards ring only as appr and pulls string	.	.	.	.	.	.	.	4	3	34	46	52	44	42	25
19	Regards ring only as ring approaches	.	.	.	.	.	.	.	7	25	80	81	85	75	69	42
20	Manipulates string before securing ring	.	.	.	.	.	.	.	0	22	6	5	15	8	0	0
21	Pulls ring off table top before secural	.	.	.	.	.	.	.	0	9	9	11	15	25	5	8
22	Dangles or bounces ring before secural	.	.	.	.	.	.	.	0	9	6	8	3	25	16	17
23	Secures ring using string	.	.	.	.	.	.	.	29	47	86	95	97	92	97	92
24	Hits or bangs ring on table top	.	.	.	.	.	.	.	17	27	14	16	35	9	24	17
25	Brings ring to mouth	.	.	.	.	.	.	.	46	58	39	30	32	24	13	20
26	Transfers ring	.	.	.	.	.	.	.	46	42	43	43	16	18	16	17
27	Turns ring	.	.	.	.	.	.	.	17	23	18	35	23	6	11	0
28	Brings ring to platform	.	.	.	.	.	.	.	13	15	7	38	42	33	26	50
29	Brings ring to side panel	.	.	.	.	.	.	.	0	4	0	5	10	24	21	13
30	Manipulates string after contact with ring	.	.	.	.	.	.	.	33	58	79	73	84	73	66	71
31	Holds ring in one hand; string in other	.	.	.	.	.	.	.	0	12	36	19	29	12	29	29
32	Dangles ring by string	.	.	.	.	.	.	.	0	8	29	49	48	58	58	58
33	Dangles ring by string after con with ring	.	.	.	.	.	.	.	0	0	25	43	45	36	50	58
34	Drops ring completely	.	.	.	.	.	.	.	33	31	36	33	39	55	45	50
35	Resecures ring	.	.	.	.	.	.	.	25	15	21	27	29	39	21	17
36	Turns or pivots	.	.	.	.	.	.	.	0	0	0	15	37	34	47	33
37	Postural activity	.	.	.	.	.	.	.	0	0	12	19	40	47	53	58

RING AND STRING

Item

- R-S15 The string may be dragged in without being grasped
- 23 This item includes only those cases where the string was in the oblique position At 32 weeks it is characteristic for the ring to be secured by the string if the string is in the median position
- 24 Includes dangling or bouncing ring by string so that the ring hits the table.
- 28 Includes dragging or dangling, or bouncing, or rubbing, or dropping and pursuing the ring to the platform, but excludes mere dropping.
- 30 Includes any contact or activity except mere regard. It includes fingering, string holding, or dangling.
- 34 Includes dropping or releasing on platform or over side rail, not releasing to dangle or release in transfer

Atlas Delineations

- R-S 6 Approaches ring: 28 weeks, p. 483, B
- 7 Approaches ring first 36 weeks, p. 489, A
- 9 Approaches string first: 28 weeks, p. 483, A (normative at 32 weeks)
- 11 Grasps string: 32 weeks, p. 486, D
- 22 Dangles or bounces ring before secural: 48 weeks, p. 495, B-C
- 23 Secures ring using string: 36 weeks, p. 489, C
- 24 Hits or bangs ring on table top: 44 weeks, p. 493, C
- 28 Brings ring to platform: 44 weeks, p. 493, D
- 30 Manipulates string after contact with ring: 32 weeks, p. 487, G, H
- 33 Dangles ring by string after contact with ring: 52 weeks, p. 497, B-C
- 36 Turns or pivots: 48 weeks, p. 495, C-D (characteristic at 52 weeks)

§ 25. RING, STRING, AND BELL BEHAVIOR (32 weeks-56 weeks)

SITUATION: RING, STRING, AND BELL (R-S-B)

R-S-B	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Approaches string first . .									67	67	77	90	86	75	64
2	Approaches ring or bell . .									33	33	23	13	17	28	44
3	Grasps string .									56	70	94	93	94	86	84
4	Fails to grasp string immediately .									50	19	32	23	20	0	0
5	Pulls ring or bell within reach .									44	74	97	93	92	86	84
6	Pulls ring off table top .									6	19	14	30	14	17	20
7	Holds ring in one hand, bell in the other .									0	10	38	27	27	26	28
8	Holds one object and reaches for other .									14	20	25	37	18	11	8
9	Drops bell or ring .									43	40	44	50	69	46	44
10	Manipulates ring first . .									57	50	56	37	15	11	4
11	Manipulates bell first . .									29	30	31	40	64	57	72
12	Manipulates bell .									14	30	44	50	64	57	64
13	Manipulates bell independently .									43	60	50	40	77	69	80
14	Manipulates ring independently .									57	55	56	40	33	23	24
15	Holds or manipulates ring and bell simultaneously .									29	55	62	67	64	60	80
16	Brings bell, ring, or string to mouth .									71	35	16	10	6	11	4
17	Brings bell to mouth .									57	30	9	10	6	9	—
18	Transfers bell, ring, or string .									14	15	19	37	24	3	4
19	Waves or rings bell .									14	30	38	37	57	40	56
20	Brings bell or ring to platform .									14	5	19	20	24	32	16
21	Combines ring and bell .									5	9	20	37	41	40	72
22	Places bell in ring or ring over bell .									0	15	3	13	33	26	56

Item

RING, STRING, AND BELL

- R-S-B 12 Includes rotating, waving, or ringing the bell
 13 Does not exclude activity with the bell in relation to the table but does exclude cases where ring is held in one hand while other is active with the bell

Atlas Delineations

- R-S-B 2 Approaches ring or bell: 32 weeks, p. 501, b
 5 Pulls ring or bell within reach: 40 weeks, p. 501, a-b
 10 Manipulates ring first 40 weeks, p. 501, b
 15 Holds or manipulates ring and bell simultaneously: 40 weeks, p. 501, d
 19 Waves or rings bell 44 weeks, p. 501, d (normative at 48 weeks)
 20 Brings bell or ring to platform: 52 weeks, p. 503, c-d
 22 Places bell in ring or ring over bell. 48 weeks, p. 503, d (normative at 56 weeks); 56 weeks, p. 503, c

§ 26. PULLED TO SITTING (4 weeks-28 weeks)

SITUATION: PULLED TO SITTING (SiP)

SiP	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Head lags	84	76	82	85	72	35	15	10	.	.	.	.	.	.	.
2	Head lags completely . .	34	23	14	8	0	0	0	0	.	.	.	.	.	.	.
3	Head lags completely or markedly .	44	45	46	27	8	6	0	0	.	.	.	.	.	.	.
4	Head lags markedly .	9	21	32	19	8	6	0	0	.	.	.	.	.	.	.
5	Head lags mod., slightly, or only initially .	41	31	36	58	64	32	15	10	.	.	.	.	.	.	.
6	Head lags moderately or slightly .	9	10	32	42	40	9	0	0	.	.	.	.	.	.	.
7	Head lags initially only .	31	21	4	15	25	23	15	10	.	.	.	.	.	.	.
8	Head compensates or lags only initially .	47	45	21	31	52	93	96	97	.	.	.	.	.	.	.
9	Head compensates .	16	24	18	15	28	70	81	87	.	.	.	.	.	.	.
10	Back extends .	26	17	7	19	17	—	—	—	.	.	.	.	.	.	.
11	Pulled with difficulty . .	—	—	25	32	23	21	21	13	.	.	.	.	.	.	.
12	Pulled easily .	0	0	0	0	27	50	57	70	.	.	.	.	.	.	.
13	Assists Examiner by pulling self forward .	0	0	0	0	8	18	42	50	.	.	.	.	.	.	.

PULLED TO SITTING

Item

- SiP 1-7 Degree of head lag can best be estimated by observing angle between chin and neck.
 11 The child sometimes slides along the platform or extends at the hips and it is then difficult to pull him to the sitting position.
 12 The head compensates, the hips flex, and the arms are tense
 13 The child lifts the head, flexes the arms and legs so that, to some extent, he pulls himself.

Atlas Delineations

- SiP 4 Head lags markedly: 6 weeks, p 161, A; 8 weeks, p 163, A
 5 Head lags moderately, slightly, or only initially: 4 weeks, moderately, p 159, B (text A indicates an initial *marked* lag)
 6 Head lags moderately or slightly: 12 weeks, moderately, p. 165, A; 16 weeks, slightly, p. 167, A
 9 Head compensates. 20 weeks, p 170, A

§ 27. SITTING BEHAVIOR (4 weeks-56 weeks)

SITUATION: SITTING (Si)

Si	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Head sags	74	56	54	12	0	.	.	.	.	.	.	.	.	.	.
2	Head only momentarily erect	35	37	14	0	0	.	.	.	.	.	.	.	.	0	0
3	Head bobbingly erect	16	46	57	56	10	0	0	0	0	0	0	0	0	0	0
4	Head set forward	13	15	32	36	41	16	9	3	0	0	0	0	0	0	0
5	Head steadily erect	3	4	0	24	53	75	91	100	100	100	100	100	100	100	100
6	Head erect when leans forward	0	0	8	12	12	56	65	73	82	86	94	100	100	100	100
7	Back extends	23	11	21	12	9	—	—	—	—	—	—	—	—	—	—
8	Back rounded uniformly	92	91	71	57	13	17	8	0	0	0	0	0	0	0	0
9	Back lumbar curvature	0	5	29	43	76	—	—	—	—	—	—	—	—	—	—
10	Body erect, supported	.	.	.	.	25	50	62	79	—	—	—	—	—	—	—
11	Body erect	0	0	0	0	0	3	30	58	67	77	88	97	94	100	96
12	Body erect moment or less than minute	0	0	0	0	0	3	27	36	27	6	0	0	0	0	0
13	Body erect one minute or more	0	0	0	0	0	0	3	21	39	72	88	100	100	100	100
14	Sits with slight or no sup. (mom. or better)	0	4	7	36	46	88	91	94	100	100	100	100	.	.	.
15	Sits only momentarily leaning forward	0	0	0	12	11	28	41	27	6	0	.	.	.	.	.
16	Sits only mom or less than one minute	0	0	0	12	11	31	56	64	39	20	0	0	0	0	0
17	Sits one minute or more	0	0	0	0	0	3	6	24	61	80	100	100	100	100	100
18	Sits for ten minutes (approx. or more)	0	0	0	0	0	0	0	0	21	57	80	97	91	95	100
19	Sits for indefinite period	0	0	0	0	0	0	0	0	21	46	66	97	85	93	100
20	Falls	100	100	100	92	80	75	84	69	58	54	23	20	6	0	0
21	Falls forward	67	77	77	81	72	64	42	25	12	23	0	0	0	0	0
22	Falls sideward	0	23	36	10	4	13	50	49	40	34	17	3	0	0	0
23	Falls backward	13	10	18	15	20	3	6	9	30	11	14	13	6	0	4
24	Leans forward passively	.	.	.	.	—	—	94	93	74	69	55	29	3	0	0
25	Leans sideward passively	0	23	36	10	12	16	56	51	46	49	17	3	0	0	0
26	Leans forward or sideward actively	0	0	0	0	0	0	3	22	45	74	86	80	80	83	64
27	Sits unsteadily	.	.	.	.	—	—	7	9	27	30	40	20	3	0	0
28	Sits leaning forward	0	0	0	12	11	31	47	58	49	26	3	0	.	.	.
29	Sits unsupported	0	0	0	12	11	34	62	88	100	100	.	.	.	.	.
30	Uses hand for support	.	.	.	.	—	—	7	47	44	42	33	11	0	0	0
31	Grasps or plays with feet	0	0	0	0	0	19	35	30	6	3	0	0	0	0	0
32	Erects self from leaning forward	0	0	0	0	0	6	18	36	40	80	94	100	91	100	100
33	Turns to side and maintains balance	0	0	0	0	0	0	0	0	9	26	74	67	76	66	76
34	Pivots	0	0	0	0	0	0	0	0	0	3	11	40	45	65	58
35	Attains prone	0	0	0	0	0	0	0	0	21	29	52	57	59	69	56
36	Attains sitting from prone if att. prone	0	0	0	0	0	0	0	0	28	20	28	71	65	57	93
37	Attains creeping or quadrupedal position	0	0	0	0	0	0	0	0	6	6	29	53	53	59	40
38	Pulls to standing	0	0	0	0	0	0	0	0	0	0	9	28	36	62	73
39	Lowers self	0	0	0	0	0	0	0	0	0	0	11	19	42	54	67
40	Attains standing independently	0	0	0	0	0	0	0	0	0	3	3	21	16	27	45
41	Attains standing independently (r)	0	0	0	0	0	0	0	0	0	9	3	24	19	29	52

- Item*
- SITTING**
- Si 11 The body is erect even though momentarily when the child is placed in the sitting position and support is completely removed
 26 This is active rather than passive behavior as opposed to item *St 25* which is "passive leaning". This item is implied in *pivoting* behavior which involves leaning over, placing the hand on the platform and shifting the legs.
 27 Wobbles or sways from side to side or forward and back.
 28 Excludes complete leaning forward, almost completely forward, and way forward, unless the record definitely indicated that the child maintained the sitting position although leaning way forward. The decline in the percentages after 28 weeks is due to the fact that the child at the later age levels sits erect although he may, during his play activities, also sit leaning forward. Such sitting leaning forward has been excluded. However, this item does imply that the child can maintain a leaning-forward position for a prolonged period.
 30 The hand may rest on the platform, on the knees, or on the feet.
 32 Includes instances where the leaning forward may seem to be passive as well as voluntary.
 36 Percentages of those who attain prone. Of those who attain prone compare this with item *Pr 44* in sitting.
 38 Is identical to item *St 43*.
 39 Is identical to item *St 45* and is included under sitting only for reference.

Atlas Delineations

- Si 1 Head sags: 4 weeks, p. 159, C; 6 weeks, p. 161, D
 2 Head only momentarily erect: 6 weeks, p. 161, C (see text 7.5-8 25 sec)
 3 Head bobbingly erect: 12 weeks, p. 165, B, C (see text)
 5 Head steadily erect: 16 weeks, p. 167, C
 6 Head erect when leans forward: 20 weeks, p. 170, C; 28 weeks, p. 179, H
 8 Back rounded uniformly: 4 weeks, p. 159, C, D; 6 weeks, p. 161, C, D, 8 weeks, p. 163, B, C; 12 weeks, p. 165, B, D
 9 Back lumbar curvature: 12 weeks, p. 165, C (normative at 16 weeks); 24 weeks, p. 174, D
 11 Body erect: 32 weeks, p. 182, A (normative at 28 weeks)
 22 Falls sideward: 28 weeks, p. 179, G
 24 Leans forward passively: 24 weeks, p. 175, G-H; 28 weeks, pp. 178-9, C-H; 32 weeks, p. 182, E-H
 26 Leans forward or sideward actively: 36 weeks, p. 185, C
 28 Sits leaning forward: 28 weeks, p. 179, H; 32 weeks, pp. 182-3, C-H
 30 Uses hand for support: 24 weeks, p. 175, H; 28 weeks, p. 178, E-H; 32 weeks, pp. 182-3, A-H
 32 Erects self from leaning forward: 36 weeks, p. 185, D
 33 Turns to side and maintains balance: 36 weeks, p. 185, A (normative at 40 weeks); 40 weeks, p. 188, A-B
 34 Pivots: 48 weeks, p. 197, A-H
 35 Attains prone: 40 weeks, pp. 188-9, A-H
 36 Attains sitting from prone: 44 weeks, pp. 192-3, D-E from creeping position; (see also Prone, 44 weeks (40), p. 133, G-H)
 37 Attains creeping or quadrupedal position: 44 weeks, p. 192, A-D
 38 Pulls to standing: 52 weeks, p. 200, A-D, H (normative at 48 weeks)
 39 Lowers self: 52 weeks, p. 201, E-G (normative at 48 weeks)

§ 28. SITTING IN CHAIR (12 weeks-52 weeks)

SITUATION: SITTING IN CHAIR (SiC)

SiC	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Placed in chair	.	.	.	.	.	100	100	100	92	85	46	28	7	7	4
2	Head erect and steady	.	.	.	.	.	0	33	67	100	100	..	..	..	..	..
3	Head turns freely	.	.	.	.	.	0	0	16	60	100	..	..	..	..	..
4	Body slumps to side	.	.	.	.	.	79	79	69	57	31	..	..	..	..	..
5	Body leans forward	.	.	.	.	.	10	14	35	33	26	..	..	..	..	..
6	Body erect	.	.	.	.	.	0	10	28	47	72	..	..	..	..	..

SITTING IN CHAIR

Only the behavior of the child in the chair before he is presented with the cubes and other test objects is considered in the analysis of *Sitting in Chair*.

§ 29. SPOON BEHAVIOR (16 weeks-36 weeks)

SITUATION: SPOON (Sp)

Sp	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards immediately					83	85	93	100	100	92					
2	Regards momentarily					30	33	7	4	—	11	.	.	.		
3	Regards recurrently					37	42	10	15	10	24					
4	Regards prolongedly					55	59	23	—	—	—					
5	Regards predominantly					83	91	97	100	100	96	.	.	.		
6	Regards consistently					10	21	80	100	100	92					
7	Shifts regard					59	55	21	22	10	38	..	..	..
8	Shifts regard to Examiner					20	6	3	12	7	12	.	.	.		
9	Shifts regard to hands					27	24	10	4	—	—	.	.	.		
10	Arm increases activity					83	91	97	100	100	100	.	.	.		
11	Approaches					43	58	90	100	100	100	.	.	.		
12	Approaches with right hand					17	24	60	44	46	23					
13	Approaches with left hand					17	30	20	45	18	46					
14	Approaches with both hands					10	—	10	11	36	31					
15	Approaches after delay	..	..	..		23	30	3	4	—	—					
16	Approaches promptly	..	..	..		20	27	87	96	100	100	.	.	.		
17	Contacts spoon	..	..	..		50	67	98	100	100	100	.	.	.		
18	Dislodges on contact	..	..	..		30	33	32	38	7	7	.	.	.		
19	Grasps	..	..	..		10	30	77	100	100	96	.	.	.		
20	Grasps with right hand	..	..	..		—	13	39	33	43	36					
21	(If grasps) grasps with right hand	..	..	..		—	43	50	33	43	36					
22	Grasps with left hand	..	..	..		11	18	32	48	25	50	.	.	.		
23	(If grasps) grasps with left hand	..	..	..		100	60	41	48	25	50	.	.	.		
24	Grasps with both hands	..	..	..		3	9	43	37	25	35					
25	Grasps in palm	..	..	..		7	27	17	30	29	15					
26	Grasps interdigitally	..	..	..		—	3	23	33	21	46	.	.	.		
27	Grasps with thumb opposing fingers	..	..	..		30	46	23	19	—	4	.	.	.		
28	Manipulates without grasp	..	..	..		—	9	7	48	29	38					
29	Manip. on and above table top and mouths	..	..	..		—	9	29	22	46	35	.	.	.		
30	Brings first to mouth	..	..	..		—	9	29	22	46	35	.	.	.		
31	Lifts from table top	..	..	..		7	31	77	100	100	89	.	.	.		
32	Brings to mouth	..	..	..		—	21	57	92	75	58	.	.	.		
33	(If brings to mouth) brings to mouth <i>first</i>	..	..	..		—	45	50	24	61	60	.	.	.		
34	Transfers	..	..	..		—	3	26	70	68	58	.	.	.		
35	Rotates	..	..	..		—	—	—	27	36	27	.	.	.		
36	Hits or bangs on table top	..	..	..		—	6	16	42	36	69	.	.	.		
37	Drops	..	..	..		10	18	36	55	36	27	.	.	.		
38	Drops and resecures	..	..	..		—	3	6	7	38	25	19	.	.	.	
39	Vocalizes	..	..	..		22	12	16	42	25	27	.	.	.	.

SPOON

Item

- Sp 2 A momentary regard after which the regard shifts to the surroundings. Following this, more prolonged regard for the spoon might occur.
- 4 Is not necessarily the first regard, but may have taken place after shifting of hands to the table top. The item, however, does relate to regard before grasp.
- 17 The child may contact the spoon while not regarding it. In this case the contact is not considered an approach.
- 28 This so-called manipulation may be an attempt to prehend the spoon.
- 30 Includes only those cases where the child's first activity took the form of carrying the spoon to his mouth.
- 38 The resecural of the spoon must follow promptly the dropping of it.

Atlas Delineations

- Sp 1 Regards immediately: *16 weeks*, p. 342, A
 4 Regards prolongedly: *16 weeks*, p. 343, F-H (over 3 seconds)
 9 Shifts regard to hands: *16 weeks*, p. 342, C
 17 Contacts spoon: *16 weeks*, p. 342, B (see text)
 18 Dislodges on contact: *24 weeks*, p. 350, B
 26 Grasps interdigitally: *24 weeks*, p. 350, D (characteristic of *28* and *32 weeks*)
 34 Transfers: *24 weeks*, p. 351, G-H (characteristic of *28 weeks*), *28 weeks*, p. 353, C-D; *32 weeks*, p. 355, B-D
 36 Hits or bangs on table top: *32 weeks*, p. 355, A (normative at *28 weeks*), *36 weeks*, p. 357, D

§ 30. STAIRCASE BEHAVIOR (40 weeks-56 weeks)

SITUATION: STAIRCASE (Stc)

Stc	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56	
1	Surmounts first tread	.											18	36	63	74	88
2	Surmounts second tread														50	74	82
3	Surmounts third tread	.			.									31	65	77	
4	Surmounts fourth tread												.	31	39	53	
5	Reaches crib platform	.												31	39	53	

STAIRCASE

Atlas Delineations

- Stc 1 Surmounts first tread: *48 weeks*, p. 152, A-D
 4 Surmounts fourth tread: *56 weeks*, pp 156-7, A-H. (Does not reach platform, see text)

§ 31. STANDING AND WALKING BEHAVIOR (4 weeks–56 weeks)

SITUATION: STANDING (St)

St	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Head sags	73	52	36	4	0	.	.	.	.	.	.	.	.	.	.
2	Head extends	23	16	7	8	5	.	.	.	.	.	.	.	.	.	.
3	Head erect only momentarily	30	14	8	0	0	.	.	.	.	.	.	.	.	.	.
4	Head sags or erect only momentarily	77	55	44	4	0	.	.	.	.	.	.	.	.	.	.
5	Head bobs or set forward	23	28	52	48	33	.	.	.	.	.	.	.	.	.	.
6	Head bobbingly erect	17	21	32	17	0	.	.	.	.	.	.	.	.	.	.
7	Head set forward	12	7	20	35	33	.	.	.	.	.	.	.	.	.	.
8	Head set forward or steadily erect	10	21	44	78	95	.	.	.	.	.	.	.	.	.	.
9	Head steadily erect	3	14	24	48	62	.	.	.	.	.	.	.	.	.	.
10	Head compensates when swayed	3	14	47	41	75	.	.	.	.	.	.	.	.	.	.
11	Legs flexed, do not extend	56	32	30	21	19	23	7	9	8	—	—	3	.	.	.
12	Legs extend briefly	42	54	52	64	59	66	50	28	21	22	12	3	.	.	.
13	Legs extend recurrently	0	10	15	24	34	50	31	31	14	13	15	19	0	0	4
14	Hips flex, legs flex or extend	100	90	81	66	70	69	50	56	52	53	40	32	31	26	.
15	Hips flex, legs held extended	15	25	25	8	31	22	22	22	37	41	33	23	13	23	.
16	Supports no weight	77	62	41	43	32	28	15	17	14	3	0	3	.	.	.
17	Offers very slight resistance	61	73	52	25	27	.	.	.	.	.	.	.	.	.	.
18	Supports a fraction of weight	19	38	59	50	61	72	72	78	83	94	97	97	97	98	100
19	Supports a large fraction of weight	3	14	23	32	22	53	53	75	83	94	97	.	.	.	.
20	Supports a large frac of wt. more than mom	0	0	0	0	4	31	41	53	76	82	91	94	97	98	100
21	Supports entire weight	0	0	4	8	2	28	28	44	55	91	94	97	97	98	100
22	One foot engages the other	10	3	4	12	27	13	19	19	17	9	9	3	2	.	.
23	Feet apart four inches or more	.	.	5	8	13	3	0	3	17	18	24	23	28	43	22
24	Toes flex	85	86	86	64	36	.	.	.	.	.	.	.	.	.	.
25	Feet rest with soles on platform	92	77	61	61	59	84	78	81	62	62	85	87	97	96	100
26	Feet inverted	.	.	.	.	.	29	5	26	12	.	.	.	.	.	.
27	Stands on toes	3	10	26	38	38	38	28	31	31	50	18	29	6	7	.
28	Stands on toes, weight not supported	3	10	26	38	38	32	32	9	3	.	.	.	.	.	.
29	Stands on toes, weight supported	.	.	.	.	0	6	9	22	28	50	18	29	6	7	.
30	Rises to toes, supporting weight	.	.	.	.	6	3	9	7	31	3	16	6	7	.	.
31	Lifts foot	23	10	41	60	59	34	41	31	28	28	40	52	86	81	88
32	Lifts foot without supporting entire weight	23	10	41	60	59	21	28	15	18	0	0	3	.	.	.
33	Lifts foot while supporting entire weight	.	.	.	.	0	13	13	16	10	28	40	48	86	81	88
34	Stepping movements not supporting weight	3	3	7	28	38	22	16	16	14	6	3	7	.	.	.
35	Bounces	.	.	.	.	13	13	25	7	9	12	19	2	4	.	.
36	Is placed standing	.	.	.	.	100	100	100	100	97	62	51	44	19	7	8
37	(Hands supported) balance inadequate	.	.	.	.	.	.	.	.	34	64	45	38	31	12	.
38	Stands only when both hands are supported	.	.	.	.	.	.	.	14	31	21	19	22	9	8	.
39	Stands holding side rail	.	.	.	.	.	.	6	14	25	51	58	72	80	44	.
40	Stands independently (without support)	.	.	.	.	.	.	.	.	.	9	10	22	33	68	.
41	Attains st. with E.'s assistance or independ.	.	.	.	.	.	.	.	.	3	28	49	56	75	74	76
42	Attains standing independently	.	.	.	.	.	.	.	.	3	3	21	16	27	45	.
43	Pulls to st holding side rail or independently	.	.	.	.	.	.	.	.	3	9	28	36	62	73	85
44	Attains standing independently (r)	.	.	.	.	.	.	.	.	9	3	24	19	29	52	.
45	Lowers self using support	.	.	.	.	.	.	.	.	11	19	42	54	67	70	.
46	Cruises or walks using support	.	.	.	.	.	.	.	.	16	24	39	72	82	88	.
47	Walks using support	.	.	.	.	.	.	.	.	3	6	16	47	63	80	.
48	Walks only when both hands supported	.	.	.	.	.	.	.	.	.	3	10	31	26	16	.
49	Walks independently	.	.	.	.	.	.	.	.	.	3	3	26	44	.	.
50	Responds pleasantly to situation	.	.	.	.	35	34	33	28	31	24	15	13	13	9	—

Note: St 43 and 45, at 44 weeks. Some children are placed standing and lower themselves, though they do not pull themselves to standing.

STANDING

Item

- St 1 Head droops, chin on chest.
 3 Head is predominantly sagging, but momentarily erect.
 6 Predominantly erect, but very unsteady.
 7 Head erect and steady, but not quite in line with body.
 10 Child is shaken gently from side to side and antero-posteriorly. Resistance in any direction is credited.
 19 Obviously includes more than a large fraction of weight support. The weight support may be momentary.
 21 The child's balance is supplied by the Examiner.
 22 Includes one foot touching the other, rubbing the other, stepping on the other, or crossing the feet
 25 The whole foot comes in contact with the platform.
 26 The outer edges of the soles only are in contact with the platform
 28 The toes come in contact with the platform. The heels may be brought down later. It also includes extension at the ankle when the weight is not supported so that only the toes touch the platform
 37 Sways, wobbles, falls back, or otherwise loses balance
 40 When placed standing, supports the weight and maintains position when supporting balance is removed.
 47 Includes walking alone.
 49 Walks without aid of person or object.

Atlas Delineations

- St 1 Head sags: 4 weeks, p 203, A-D, 6 weeks, p 205, C-D
 3 Head erect only momentarily: 6 weeks, p 205, B (2 25 sec)
 7 Head set forward: 12 weeks, p 209, A-D
 9 Head steadily erect: 16 weeks, pp 212-3, A, D-F
 10 Head compensates when swayed: 16 weeks, p. 212, D (see text)
 11 Legs flex, do not extend: 4 weeks, p 203, A-D
 12 Legs extend briefly: 6 weeks, p 205, B (5 sec), 8 weeks, p 207, B (1 25 sec.)
 13 Legs extend recurrently: 20 weeks, p 217, E-G
 15 Hips flex, legs held extended: 36 weeks, pp. 222-3, A-E
 16 Supports no weight: 4 weeks, p 203, B, D; 6 weeks, p 205, C (see text)
 18 Supports a fraction of weight: 8 weeks, p. 207, B-C
 19 Supports a large fraction of weight: 20 weeks, pp. 216-7, A-E, G-H
 21 Supports entire weight: 36 weeks, pp 222-3, A-H (normative at 32 weeks)
 23 Feet apart four inches or more. 48 weeks, pp 230-1, A, G (characteristic of 52 weeks)
 28 Stands on toes, weight not supported. 12 weeks, p 209, A-D, 20 weeks, p 216, A-D, 28 weeks, p. 219, A-D
 29 Stands on toes, weight supported — see Staircase: 40 weeks, p 148, A (normative at 36 weeks)
 30 Rises to toes, supporting weight — see Staircase: 40 weeks, p. 148, C (normative at 36 weeks)
 32 Lifts foot without supporting entire weight: 12 weeks, p 209, B
 33 Lifts foot while supporting entire weight: 44 weeks, pp 226-7, D, E, G-H (normative at 48 weeks)
 34 Stepping movements not supporting weight: 12 weeks, p 209, B-D; 16 weeks, pp 212-3, A-G
 35 Bounces. 28 weeks, p. 219, A-D
 37 (Hand supported) balance inadequate: 36 weeks, pp 222-3, B-F (normative at 40 weeks)
 38 Stands only when both hands are supported: 36 weeks, pp. 222-3, A-H
 39 Stands holding side rail. 44 weeks, pp 226-7, A-H (normative at 40 weeks)
 40 Stands independently (without support). 56 weeks, p. 237, C
 42 Attains standing independently — see Prone: 60 weeks (56), p 144, A-C
 43 Pulls to standing holding side rail or independently: 48 weeks, p. 231, E-F
 45 Lowers self using support 48 weeks, p. 231, G-H
 46 Cruises: 48 weeks, p. 230, A-D
 47 Walks using support: 52 weeks, pp 234-5, A-H
 49 Walks independently: 56 weeks, p. 237, A-C (A-B, one hand held)

§ 32. SUPINE BEHAVIOR (4 weeks-40 weeks)

SITUATION: SUPINE (Su)

Su	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Head predominantly rotated	100	97	93	84	20	0									
2	Head predominantly rotated to same side	72	64	79	69	33										
3	Head in midposition only momentarily	44	11	25	15	0										
4	Head maintains midposition	53	36	48	62	76	100									
5	Head predominantly in midposition	0	4	7	15	67										
6	Rotates head perceptibly	66	61	54	69	71										
7	Rotates head from one side to the other	38	32	29	38	57										
8	Lifts head	0	0	0	0	11	13	10	35	16	33	68				
9	Arms prominently in t-n-r position	100	97	93	64	30	0									
10	Face arm ex lat or flexed forearm vertical	56	75	71	60	—										
11	Occiput arm at occiput, shoulder, or chest	81	68	64	56	29										
12	Arms symmetrical	38	43	25	62	63										
13	Arms prominently symmetrical	19	18	21	40	63										
14	Arms ex. lat or flexed, forearm vertical	25	32	46	35	54										
15	Arms extended laterally, or at side of trunk	38	25	25	23	34	28	40	35	22	13					
16	Arms flexed	62	46	57	56	68	57	48	35	25	8					
17	Arms predominantly flexed	0	16	40	31	59	45	44	19	9	4					
18	Arms flexed, hand beside head	32	21	14	20	27	8	28	5	4	—					
19	Arms flexed, hand on chest	19	11	14	24	17	15	5	5	4						
20	Arm extended	81	89	82	64	53	57	41	58	58	46					
21	Arm predominantly extended	0	0	12	12	7	35	8	35	17	3					
22	One arm extended	59	75	64	44	25	20	10	23	48	29					
23	Arm extended vertically or laterally	25	21	32	31	34	44	28	35							
24	Arm ex. at side of body or directly footward	31	32	18	20	14	35	36	35	52	29					
25	Arms extended	44	32	32	28	31	40	35	42	16	20					
26	Arms in windmill motions	25	7	11	8	0	0	0	0	0	0					
27	Hand predominantly closed	100	100	92	72	63	31	30	21							
28	Hands predominantly closed	66	83	92	52	35										
29	Hand predominantly open	33	16	16	50	59										
30	Hands predominantly open	0	0	8	28	35	69	70	79							
31	Hand at mouth	41	21	29	24	38	15	20	0	8						
32	Face hand at mouth	38	11	21	12	0										
33	Fingers or scratches body	9	18	32	40	39										
34	Hands in contact, arms flexed	16	4	11	28	47	33	14	8	0						
35	Hands active in mutual fingering	0	0	0	8	27	32	15	10	..						
36	Hands engage at distance from chest	0	0	0	0	12	20	10	5							
37	Grasps foot	0	0	0	0	0	0	8	28	35	8					
38	Pulls foot to mouth (r)	0	0	0	0	4	10	24	31	44	8					
39	Leg predominantly flexed	90	100	93	92	81	57	68	48	5	19					
40	Legs acutely flexed at knees and hips	32	29	32	29	46	48	36	35	26	17					
41	Legs flexed, heels on platform	81	79	89	72	55	57	52	52	36	50					
42	Legs flexed, outwardly rotated	91	93	97	96	94	79	72	43	45	22					
43	Leg extends briefly	65	82	57	42	32										
44	Legs ex. on platform more than briefly	3	0	0	0	9	24	36	—	4	4					
45	Legs extended and lifted more than briefly	3	4	0	4	2	21	28	54	65	42					
46	Both legs active	69	75	71	80	96	..									
47	One leg independently active	35	54	64	58	24										
48	Face leg more active than occiput leg	19	36	29	19	0	0	0	0	0	0					
49	Feet engage	19	18	25	23	38	21	36	30	18	12					
50	Lifts leg from platform	72	86	82	77	70	71	84	87	86	72					
51	Leg flexed, lifts and lowers	53	61	61	42	33										
52	Kicks	22	29	54	58	40	36	28	35	41	31					
53	Lifts head and shoulders	0	0	0	0	0	7	7	15	8	20	63				
54	Lifts head, shoulders, and feet	0	0	0	0	0	0	3	4	8	13	16				
55	Rolls or swings pelvis	35	25	57	58	32	21	7	8	8	4					
56	Pivots	7	0	0	0	29	28	21	4	17	—					
57	Arches back	3	7	0	8	8	7	27	4	—	8					
58	Bounces hips	0	0	0	0	4	0	10	4	—	—					
59	Progresses headward (r)	38	35	37	50	43	27	17	0	4						
60	Rolls to side	39	21	29	12	50	59	62	54	54	68					
61	Rolls to prone	0	0	0	0	0	3	17	19	29	38	42				
62	Rolls to prone or attains sit. with slight assistance	0	0	0	0	0	3	17	19	28	54	68				
63	Rolls to prone or attains sitting	0	0	0	0	0	3	17	19	28	42	58				
64	Stares vacantly	59	4	0	0	0	0	0	0	0	0	0				
65	Fixates definitely	19	88													
66	Stares at window or wall	75	52	45	44	17										
67	Regards Examiner	68	71	63	84	81	53	41	42	24	13					
68	Regards hand	0	0	15	24	5	7	7	—	—	—					
69	Facial expression attentive	22	68					..	..	..	..	

Extended laterally means at right angles to body. (r) = report

- SUPINE**
- Item*
- Su 2 The head may turn to the opposite side, but immediately returns to the preferred side.
 3 The head remains in the midposition less than two seconds but not longer
 4 The head definitely, even though momentarily, comes to rest in the midposition
 8 This is unsolicited activity Head lifting may be concomitant with other activities, such as lifting the feet, or it may refer to some activity, such as lifting the head and shoulders. At 28 weeks it is apparently an effort directly to attain the sitting position The drop at 32 weeks is probably due to the fact that the child is unsuccessful in this direct attempt and therefore rolls instead to the side, whereas at 40 weeks, with increased development, he can by using the arm, bring himself to the sitting position without rolling to the side or to prone
 9 Both arms are always involved. The occiput arm is flexed while the face arm is more or less extended
 16 Any marked flexion during the situation when the child is at rest
 18 Both arms rest flexed at the side on the platform, the hands supinated near the head. The upper arm is abducted and rotated
 24 Includes one or both arms reaching toward the feet.
 27-30 The percentages at 4 through 12 weeks have been determined by cinema analysis.
 33 One hand fingers or scratches any part of the child except the other hand. Since at the ages when this behavior is fairly prominent the hands are in the head-chest or in the chest and abdomen zone, the scratching is usually in connection with the trunk, but it may be the head or thigh.
 34 The hands meet over the chest or face.
 35 The hands engage or one hand fingers the other This item therefore includes grasping of one hand by the other, in addition to either one or both hands fingering the other hand.
 37 The fact that this item was seen with not greater frequency is probably due to the short period of observation. Grasping the foot is very common behavior in the child's development
 38 This item probably was under-reported. The peak of frequency, however, is at 32 weeks, both for observation and report
 40 Acute flexion of both legs so that the heels are over the pubis is highly characteristic of 16 and 20 weeks Also at 16 and 20 weeks the infant tends to hold this position for longer periods
 41 It will be noted that at all ages except at 32 weeks, the child is seen to rest with legs and heels in contact with the platform, but at 32 weeks when grasping the foot is very common behavior, the legs tend to be held lifted continuously.
 47 One leg is active while the other is completely inactive.
 59 Includes reported as well as observed behavior
 60 Rolling to the right or left or both, includes rolling completely to the side and rolling halfway to the side

Atlas Delineations

- Su 1 Head predominantly rotated: 4 weeks, pp 50-1, A-H; 6 weeks, pp 54-5, A-H; 8 weeks, pp 58-9, A-H
 2 Head predominantly rotated to same side 4 weeks, pp. 50-1, A-H; 6 weeks, pp 54-5, A-H; 8 weeks, pp. 58-9, A-H
 4 Head maintains midposition: 12 weeks, p 63, F
 5 Head predominantly in midposition: 20 weeks, pp 70-1, A-B, E-H (normative at 16 weeks)
 6 Rotates head perceptibly: 4 weeks, p. 50, B-D (see text); 8 weeks, pp. 58-9, B-G, 12 weeks, p 63, E-G
 7 Rotates head from one side to the other: 16 weeks, p 67, F-H
 9 Arms prominently in t-n-r position: 4 weeks, p 50, A-C; 6 weeks, pp. 54-5, A-H, 8 weeks, p 58, A-D, 12 weeks, pp 62-3, A-B, G-H
 13 Arms prominently symmetrical: 8 weeks, p 59, E-G (normative at 12 weeks); 12 weeks, pp. 62-3, C-F
 17 Arms predominantly flexed: 8 weeks, pp 58-9, A-H, 16 weeks, pp. 66-7, A-H
 22 One arm extended: 4 weeks, p 50, A-C; 6 weeks, pp 54-5, A-H
 24 Arm extended at side of body or directly footward: 24 weeks, pp. 74-5, A-C, E, F; 28 weeks, pp. 78-9, A-G
 25 Arms extended: 4 weeks, p. 51, E-H; 20 weeks, p. 70, D
 26 Arms in windmill motions. 4 weeks, pp 50-1, D-E
 28 Hands predominantly closed: 4 weeks, pp 50-1, A-H; 6 weeks, pp 54-5, A-H; 8 weeks, pp. 58-9, A-H
 29 Hand predominantly open: 16 weeks, pp. 66-7, A, B, E-H (right hand); 20 weeks, pp 70-1, A-H (both hands)
 31 Hand at mouth. 16 weeks, p. 66, C
 34 Hands in contact, arms flexed: incipient, 12 weeks, p 62, C-D; 16 weeks, p. 67, E-H
 36 Hands engage at distance from chest: 20 weeks, p. 70, C
 37 Grasps foot: incipient, 24 weeks, p. 74, A, 28 weeks, pp 78-9, B-E, F
 40 Legs acutely flexed at knees and hips: 16 weeks, p 67, H; 20 weeks, p 70, C; 24 weeks, p. 74, B-C; 28 weeks, p. 79, G, H. (Inspection of the pictures illustrating the subsequent age levels shows that the flexion at the knees becomes less, although marked flexion at the hips continues.)
 41 Legs flexed, heels on platform: 4 weeks, pp. 50-1, A, D-E; 6 weeks, p. 54, B-C; 16 weeks, pp. 66-7, C-F

Item

- Su 42 Legs flexed, outwardly rotated: *4 weeks*, pp. 50-1, A, D-E; *6 weeks*, p. 54, B-C, *16 weeks*, pp. 66-7, C-F
 46 Both legs active: *4 weeks*, pp. 50-1, B-E, G-H; *6 weeks*, pp. 54-5, A-H; *8 weeks*, pp. 58-9, B-H, *12 weeks*, pp. 62-3, D-E; *16 weeks*, pp. 66-7, B-H
 49 Feet engage. *16 weeks*, p. 67, H, *24 weeks*, p. 75, B-C, G-H
 50 Lifts leg from platform. (retains feet lifted from platform), *24 weeks*, p. 74, A-D (8.75 sec); *28 weeks*, pp. 78-9, A-H (15 sec)
 52 Kicks: *8 weeks*, pp. 58-9, B-G
 53 Lifts head and shoulders: *40 weeks*, p. 88, C-D
 54 Lifts head, shoulders, and feet. *40 weeks*, p. 88, B
 55 Rolls or swings pelvis: *12 weeks*, p. 62, C, F
 56 Pivots *16 weeks*, p. 67, H; *20 weeks*, pp. 70-1, A-H
 60 Rolls to side. *16 weeks*, p. 66, A-B
 61 Rolls to prone incipient, *32 weeks*, p. 82, A-H; *36 weeks*, p. 85, A-D
 63 Rolls to prone or attains sitting: *40 weeks*, pp. 88-9, A-H
 68 Regards hand *12 weeks*, p. 63, G

§ 33. TABLE TOP BEHAVIOR (12 weeks-56 weeks)

SITUATION: TABLE TOP (T)

T	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards hands					35	44	13	10	—	11	—				
2	Hand to mouth					31	27	3	3	12	—					
3	Hands active in mutual fingering					0	14	3	3							
4	Hands mutually contact					27	25	3								
5	Hand at table edge					33	34	27	29	27	19	14	3		4	
6	Hand pronate on table top					30	27	23	42	26	32	21	15	21	9	
7	Exploits table top					61	61	60	68	35	19	7	7	—		
8	Fingers table top					58	32	20	23	—	..	..	..	..
9	Scratches table top					5	25	40	39	19	7	7				
10	Slaps table top					4	3	32	62	48	57	45	19	21	16	16
11	Depends on mother					11	10	13	23	19	11	10	14	11	14	16
12	Adjusts poorly					10	13	29	69	59	68	83	82	86	68	92
	Per cent to whom toy was given															

TABLE TOP

Item

- T 3 Cf Su 35
 7 Includes scratching, fingering, rubbing, kneading, or raking
 10 Includes also what might be described as hitting and patting
 11 The mother's presence is definitely required for the child's adjustment, or the child fusses or clings to the mother as she leaves.

REPORTED ITEMS OF BEHAVIOR

§ 34. FEEDING HABITS (4 weeks–56 weeks)

SITUATION: FEEDING HABITS (f)

f	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Has night feeding .	91	90	94	89	80	67	69	65	49	57	41	33	17	18	9
2	Has no night feeding .	7	7	7	11	20	31	18	23	48	43	55	60	83	79	86
3	Has two night feedings or more .	65	38	40	35	29	19	16	23	4	0	3	7	3	0	5
4	Is nursed .	65	62	50	42	41	53	41	50	41	32	28	30	11	5	0
5	Is nursed only .	48	38	29	27	27	38	31	35	30	29	10	19	10	5	0
6	Has bottle feeding .	52	62	71	73	73	62	72	65	70	64	79	70	73	60	74
7	Is bottle fed, not nursed .	36	38	50	58	59	47	59	54	59	61	63	59	73	60	73
8	Has bottle feeding and is nursed .	16	24	21	15	14	15	10	11	11	4	17	11	0	0	0
9	Fed with spoon . . .	0	4	8	12	35	59	64	75	80	96	97	97	98	89	98
10	Fed with cup . . .	0	0	0	0	0	0	4	12	18	23	28	37	50	61	68
11	Has cod-liver oil . . .	32	45	68	81	71	72	66	54	63	54	35	34	43	35	41
12	Has orange juice . . .	26	45	75	92	74	66	74	57	70	71	59	52	67	48	77
13	Has cereal . . .	0	0	0	4	19	34	59	65	88	89	83	89	93	75	91

FEEDING HABITS

- Item*
- f 1, 2, 3 Night feeding includes any feeding from 9:30 P.M. to 5:00 A.M., that is, it includes the 10 o'clock feeding at night as well as an early 4 o'clock feeding. In two cases where no night feeding at 4, 6, and 8 weeks occurred, the infants were put to bed very early and had a feeding between 7 and 8 in the evening and then slept through the night until 5:30 the following morning.
- 9 Not in connection with cod-liver oil or orange juice or other liquids, but used in giving cereal or vegetable pulp or other semisolid food.
- 11 When asked concerning cod-liver oil, the mothers, especially in the summer time, frequently remarked that the children were not getting cod-liver oil in the summer because the doctors had recommended that it be dropped then. The percentages may therefore be affected by the seasons rather than the age of the child.

§ 35. PERSONAL BEHAVIOR (4 weeks–16 weeks)

SITUATION: PERSONAL BEHAVIOR (per)

per	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Regards hand .	0	3	15	73	80	.	.	..	.	.	.	.	.	.	.
2	Brings hands together .	0	0	7	42	72	.	.	..	.	.	.	.	.	.	.
3	Hands active in mutual fingering .	0	0	4	23	52	.	.	..	.	.	.	.	.	.	.
4	Pulls at dress .	8	7	22	73	64	.	.	..	.	.	.	.	.	.	.
5	Pulls dress over face .	4	0	4	31	52	.	.	..	.	.	.	.	.	.	.
6	Kicks off blankets .	35	59	85	—	—	.	.	..	.	.	.	.	.	.	.
7	Kicks in bath . . .	4	24	45	69	80	.	..	..	.	.	.	.	.	..	..
8	Likes sitting . . .	0	0	3	50	57	.	.	..	.	.	.	.	.	..	..
9	Sits propped with pillows .	0	0	4	42	63	.	.	..	.	.	.	.	.	..	..
10	Resents supine .	0	0	3	15	36	.	.	..	.	.	.	.	.	..	..
11	Anticipates feeding on sight of food .	0	0	7	42	68	.	.	..	.	.	.	.	.	..	..

PERSONAL

In general the reliability of the reported personal behavior is more objective and therefore more reliable than reported social behavior; exceptions are items per 8, 10, 11.

Item

per 1 Cf. Su 68

2 Cf. Su 34

3 Cf. Su 35

§ 36. PLAY OPPORTUNITIES (4 weeks-56 weeks)

SITUATION: PLAY OPPORTUNITIES (pl)

pl	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Is held	13	32	38	47	20										
2	Plays in crib	100	80	53	60	50	40	21	35	35	21	26	15	10	23	8
3	Plays in carriage	0	28	46	38	50	67	84	48	48	39	35	27	24	31	12
4	Plays in crib or carriage	100	96	88	91	90	80	63	69	78	55	61	42	31	12	16
5	Plays in high chair	0	0	0	0	6	13	16	52	22	28	30	31	38	27	4
6	Plays in high chair or swing	0	0	0	13	6	20	16	61	26	31	30	31	45	3	4
7	Plays in pen	0	0	0	0	0	0	0	4	0	10	13	35	31	31	37
8	Plays on floor	0	0	0	0	0	0	16	4	26	23	26	35	31	42	75
9	Plays on floor or in pen	0	0	0	0	0	0	16	9	26	34	39	62	52	62	87
10	Plays in Taylortot or kiddy car	0	0	0	0	0	0	0	0	4	2	13	31	31	8	4
11	Plays on floor or in pen or kiddy car	0	0	0	0	0	0	16	9	30	36	52	88	79	65	91
12	Plays with paper	.	.	.	.	.	0	25	26	8	11	15	8	8	—	9
13	Plays with spoon	.	.	.	.	0	18	7	15	44	31	23	23	18	18	0
14	Plays with clothespin	.	.	.	.	0	4	15	12	39	15	0	23	9	5	1
15	Has rattle	0	3	11	29	66	93	100	58	50	62	23	23	9	18	.
16	Has doll or toy animal	0	0	0	0	10	36	70	58	72	62	69	62	64	55	70
17	Has one toy	0	3	11	31	75	100	100								.
18	Has only one toy	0	3	11	27	63	29	0								.
19	Has two or more toys	0	0	0	4	13	71	100								.
20	Has three or more toys	0	0	0	0	0	46	74								.

PLAY OPPORTUNITIES

Play opportunities are much more indicative of the parent's notions of child care than of the infant's own behavior equipment. However, the child does have some influence in determining where he plays and what he plays with.

Item

- pl 2-4 While the child is still in the supine stage of development, he is naturally placed in the crib or carriage.
- 5 The high chair can be used as soon as the infant begins to sit up.
- 7-9 As soon as a child begins to stand, he is usually placed on the floor in a pen to safeguard against serious falls.
- 7 The pen is most useful to confine a child in a certain part of a room when he begins to pull to standing and cruise. It is of interest that beginning at 44 weeks at least one third of the infants used a play pen.

§ 37. SOCIAL BEHAVIOR (4 weeks-56 weeks)

SITUATION: SOCIAL BEHAVIOR (so)

so	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Responds to smiling and talking	8	62	63	—	—						•		•	•	•
2	Visually pursues moving person	12	69	74	—	—	•	•	•					•	•	•
3	Knows mother	3	21	39	81	92	—	•	•	•	•	•	•	•	•	•
4	Sobers at strangers	0	3	4	35	56	—	•	•	•	•	•	•	•	•	•
5	Turns head on sound of voice	0	3	26	42	50	100	—	•	•	•	•	•	•	•	•
6	Accepts strangers	100	100	100	100	80	61	52	59	41	39	39	26	18	18	14
7	Withdraws from strangers	0	0	0	0	19	8	24	16	47	42	19	48	44	30	9
8	Adjusts to words	0	0	0	0	0	8	12	16	47	68	75	94	82	89	73
9	Responds to "Bye-bye"	0	0	0	0	0	3	3	3	13	35	53	65	38	59	27
10	Adjusts to commands	0	0	0	0	0	0	0	3	22	23	31	55	56	73	50
11	Responds to inhibitory words	0	0	0	0	0	0	0	3	25	23	28	45	44	52	23
12	Responds to "So big"	0	0	0	0	0	0	0	0	6	7	8	26	18	34	—
13	Elicits attention	0	0	0	0	0	0	0	0	9	16	14	26	27	53	50
14	Plays pat-a-cake	0	0	0	0	0	0	0	3	6	19	23	25	42	27	50
15	Plays peekaboo	0	0	0	0	0	0	0	6	6	0	9	13	11	9	25

SOCIAL

Item

- so 3 Cf. per 11 (only 68 per cent at 16 weeks). It is interesting, if true, that at 16 weeks recognition of the mother is reported in almost twice as many cases as the response of recognition to food
- 6 The child may be sober at first, but after a brief period, two or three minutes, he does not withdraw from them advances Friendly with strangers "Will go to anyone"
- 7 First response to strangers is one of withdrawal and subsequent adjustment is slow. Includes a report of, "Is very sober" but not "Is sober," or "Is grave."
- 8 Includes waving bye-bye although the stimulus may have included a gesture; also includes a report of positive response to "Where is the ——" as well as a selective turning of the head to the child's own name
- 9 Includes opening and closing of the hand in addition to waving
- 10 Includes only response to verbal directions
- 11 Includes shaking of the head and crying at "no, no," as well as inhibition of acts.
- 13 Only vocal attempts which are so directed to the person not watching the child that the person's attention is attracted. For instance, a child may cough, wait, and cough again until a person looks at him At later ages he may point to an object and say "see."
- 14 Spontaneous behavior, on command, or on demonstration; not merely a continuing of the motion when the child's hands are held and clapped
- 15 Does not include "laughs at" or "hide and seek" at 52 and 56 weeks.

§ 38. TOILET HABITS (4 weeks-56 weeks)

SITUATION. TOILET HABITS (to)

to	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Has no regular toilet training	100	100	100	97	87	65	52	53	41	39	17	14	10	4	13
2	Has regular toilet training	0	0	0	3	12	35	48	47	59	71	83	86	90	96	90
3	Never soils diapers	0	0	0	3	3	4	7	8	7	17	18	21	20	23	30

TOILET HABITS

Item

- to 3 At 56 weeks if we base the percentages of "never soils diapers" on the number of cases reporting on this specific item, the per cent is exactly 50. However, it is more likely that if the child had reached this stage of development the mothers would have called the Examiner's attention to that fact without specific questioning from her.

§ 39. VOCALIZATION (4 weeks-56 weeks)

SITUATION. VOCALIZATION (v)

v	BEHAVIOR ITEMS	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
1	Face brightens	40	68	—	—	—	—	—	—	—	—	—	—	—	—	—
2	Chuckles	0	0	36	42	24	—	—	—	—	—	—	—	—	—	—
3	Smiles	22	65	96	100	100	—	—	—	—	—	—	—	—	—	—
4	Laughs	0	0	7	31	88	—	—	—	—	—	—	—	—	—	—
5	No vocalization heard during examination	45	31	21	15	28	—	—	—	—	—	—	—	—	—	—
6	Vocalizes small throaty noises	84	72	3	4	4	—	—	—	—	—	—	—	—	—	—
7	Vocalizes ah-uh-eh	40	96	82	96	67	—	—	—	—	—	—	—	—	—	—
8	Coos	0	3	42	88	76	—	—	—	—	—	—	—	—	—	—
9	Blows bubbles	0	0	3	42	44	—	—	—	—	—	—	—	—	—	—
10	Gurgles	0	0	10	42	56	—	—	—	—	—	—	—	—	—	—
11	Vocalizes da .				0	7	7	18	59	64	63	62	69	67	59	59
12	Vocalizes ma or mu				5	11	26	43	47	51	60	52	60	64	64	64
13	Two syl., 2nd rep first, ma-ma, ba-ba, etc				14	11	7	25	66	70	80	83	86	79	91	91
14	Makes "d" sound				0	7	22	21	66	64	69	62	88	67	73	73
15	Makes "m" sound				5	11	26	43	47	58	63	55	60	64	64	64
16	Makes "ē" sound (at end of word)				0	4	7	7	16	12	14	35	46	48	64	64
17	Makes "b" sound				9	4	15	14	22	24	32	41	32	57	64	64
18	Says no "word"				. 100	100	100	93	88	79	66	31	23	12	5	5
19	Says one "word" or more						0	7	12	21	34	69	77	88	95	95
20	Says two "words" or more						0	4	0	3	3	28	34	67	86	86
21	Says three "words" or more						.	.	.	.	0	10	26	40	68	68
22	Says four "words" or more						.	.	.	.	0	7	9	26	36	36

VOCALIZATIONS

The mother was not usually able to describe the various sounds the baby was making at home so that they could be recorded with satisfaction. However, they were able to distinguish between the guttural ones and those using either the front part of the tongue or the lips. As soon as the sounds resembled words in our language the report became more reliable and recordable. It was then that the *b*, *d*, *m*, and *ē* sounds could be identified. The first three of these were used at the beginning of a wordlike sound and the last, *ē*, terminated it as in see, baby, kitty and other such words.

§ 40. WAKING AND SLEEPING PERIODS

In tabulating the waking and sleeping data the following assumptions were made:

1. Night feeding, either breast or bottle, was assumed to interrupt the night sleep 15 minutes unless the parent indicated otherwise.
2. Intervals reported as "awake off and on" were counted as one sleeping and one waking period. One half the interval time was counted as sleeping time.
3. If the parent could not specify how soon the child went to sleep after being arranged for a nap it was assumed that he was asleep after 10 minutes.

The sleep data have been discussed both in *Infant Behavior* and also more fully in an article by Thompson.² The general increase with age in wakefulness and in duration of the longest waking period, and the corresponding decrease in number of sleeping periods is self-evident (see tables, pp. 145-6). As the standard deviations indicate, there is great individual variability in sleeping and waking hours and periods. Beyond this normal variation, extremes in either direction indicate the desirability of investigating more fully the child's physical wellbeing as well as his daily routine. An appraisal of the child's waking and sleeping habits should certainly be a part of the investigation of any behavior problem. Long continued, unusual wakefulness or drowsiness has considerable significance; it may indicate a deep-seated physiological or constitutional condition; it may be associated with a transitory illness; and accompanied by or associated with fretfulness and crying, it may signify a faulty diet or routine. Not infrequently a simple readjustment of the feeding schedule will quickly establish or re-establish a normal sleep routine.

² Thompson, Helen: "Duration and Periods of Waking and Sleeping in Infancy." *Psychol. Bull.*, 1934, 31, 8.

WAKING HOURS — Hours Awake During 24-Hour Period

Age (Weeks)	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
No cases Boys	15	14	14	13	26	15	14	14	16	17	19	16	19	21	15
Girls	15	14	14	13	23	16	17	16	17	18	15	16	17	25	12
Hours															
Boys Average	4.55	6.77	6.70	7.21	7.62	7.85	8.73	8.52	8.42	8.72	9.49	9.63	9.78	9.98	10.43
Sigma	. .	1.90	2.60	1.16	1.60	1.73	1.03	1.44	1.78	95	1.51	1.25	1.36	1.63	1.89
Girls Average	. .	3.85	4.68	5.54	6.56	6.97	7.42	8.15	8.36	8.84	9.03	8.93	9.63	10.25	9.99
Sigma	. .	1.37	.88	1.81	1.95	1.37	1.61	1.01	1.28	2.00	1.39	1.57	.72	.96	1.29

AVERAGE NUMBER OF HOURS IN LONGEST WAKING PERIOD

Boys	1.88	3.18	2.79	3.33	3.33	3.30	3.84	3.54	3.61	3.81	4.11	4.80	4.63	5.48	5.77
Girls	1.97	2.14	2.39	2.50	2.96	3.30	3.93	3.63	4.26	4.08	4.39	5.05	5.28	5.31	5.75

SLEEPING PERIODS IN 24 HOURS
Number Periods

Boys. Average	. .	6.86	6.14	6.43	5.85	5.54	5.00	4.71	5.00	4.06	4.29	4.05	3.50	3.47	3.05	2.73
Sigma	. .	1.26	1.24	1.24	2.51	1.12	.97	1.28	93	75	1.07	1.05	1.00	1.27	.95	.57
Girls: Average	. .	6.27	6.14	6.50	5.77	5.52	4.94	4.59	4.75	4.12	4.06	3.67	3.25	2.94	3.00	2.83
Sigma	. .	9.97	1.06	1.37	1.28	1.09	.77	.66	1.08	.85	1.08	.90	.87	.80	.69	

Age (Weeks)	4	6	8	12	16	20	24	28	32	36	40	44	48	52	56
Number cases	30	28	28	26	49	31	31	30	33	35	34	32	36	46	27
Hours															
Boys and girls. Average	4.20	5.73	6.12	6.85	7.31	7.63	8.41	8.43	8.64	8.88	9.24	9.63	9.99	9.98	10.46
Sigma	1.72	1.94	1.14	1.78	1.60	1.38	1.25	1.54	1.59	1.45	1.43	1.09	1.38	1.59	1.74

Waking Hours — Durang 24-Hour Period								
	6	8	12	16	20	24	28	32
28	28	26	49	31	31	30	33	
Hours								
5.73	6.12	6.85	7.31	7.63	8.41	8.43	8.64	8
1.94	1.14	1.78	1.60	1.38	1.25	1.54	1.59	1

Boys and girls	1.93	2.66	2.59	2.91	3.14	3.30	3.90	3.59	3.95	3.94	4.23	4.92	4.94	5.39	5.76
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SLEEPING PERIODS IN 24 HOURS Number Periods

Boys and girls	Average	6 56	6 14	6 46	5 81	5 53	4 97	4 65	4 87	4 09	4 17	3 88	3 38	3 22	3 02	2 78
Signra	.	1 14	1 16	1 52	2 02	1 19	1 03	1 03	80	.94	.97	1.08	.96	1 13	.88	.63

CHAPTER VIII

MATURITY LEVEL SUMMARIES

THE developmental progress of infant behavior can be envisaged as a series of advancing levels of maturity. The present chapter formulates these levels for the fifteen ages represented in the normative study. For convenient reference the behavior is roughly classified by functional categories, the situations in which the behavior occurs being indicated by italics.

The summaries are cumulative in the sense that certain developmental sequences are carried through from one age level to another. For the sake of brevity, each age characterization is limited mainly to those features of behavior which are (statistically) critical for that age. Emphasis is thereby placed on normatively distinctive items.

Properly interpreted, these items enable one to picture in outline the totality of behavior typical of a single age. Accordingly the summaries may be used for preliminary clinical orientation at the beginning of a developmental examination. The summaries may also be used as comparative standards for the appraisal of behavior at the conclusion of an examination.

It is not assumed that any infant, normal or abnormal, will conform completely to the normative criteria of a single age level. But the underlying maturational trends are such, that in general the infant's behavior will conform more closely to one particular age level than to any other. The task of appraisal is to project the behavior picture which has been observed against the normative summary which most closely fits the actual observations. By a process of matching with subsequent formulations of the specific deviations, the behavior status of the child can then be expressed in terms of the specifications of the maturity level summaries.

The summaries which follow are expressed in brief descriptive and narrative phrases. Clinical experience will serve to give concreteness and meaning to the descriptions. The summaries may also be vivified by a study of the pictorial delineations of *An Atlas of Infant Behavior* as indicated on pages 163-4. The *Atlas* illustrates how the normative behavior items express themselves in

the moving stream of the infant's behavior. The cinema records on which these pictorial delineations are based can be used to give further vitality to the normative criteria.

§ 1. NORMATIVE BEHAVIOR: 4 weeks

HEAD CONTROL. When the infant lies *supine*, his head, although predominantly rotated to the side, may be briefly maintained in the midposition. *Pulled-to-sitting*, the head lags completely or only at the beginning of the pull. *Supported sitting*, although the head usually sags it may be held erect momentarily. As the child is *lowered prone*, his head droops. *Prone*, the head rotates as it rests on the platform; momentarily the head lifts as high as Zone 1. *Standing*, the head sags or erects only for a brief moment. In a child with extensor tendencies, however, the head may even extend backward.

ARM-HAND POSTURE. *Supine*, with the head rotated, the tonic-neck-reflex posture of the arms is almost invariable at this age. In this t-n-r posture, the occiput arm is flexed with hand near the occiput or in the head-chest region, while the face arm is extended laterally or at the side. Symmetrical windmill movements may occur. Both hands are predominantly closed, but one hand, the face hand, may open. *Prone*, the arms are flexed close to the chest, but during activity the hand may be lifted from the platform by elbow flexion.

LEG-FOOT POSTURE. *Supine*, the legs are flexed and outwardly rotated; one leg at least extends briefly. *Prone*, the legs are flexed and adducted; active but usually ineffective crawling movements occur. *Standing*, the legs do not extend and usually they support none of the child's weight, although at some time during the situation they offer slight resistance to the platform. The toes flex when in contact with the platform.

BODY POSTURE AND PROGRESSION. *Sitting*, the back is uniformly rounded.

REGARD. *Supine*, the infant stares at the window or wall; fixation is not definite. The *dangling ring* is disregarded in the midplane but is regarded when brought into the line of vision, eyes and head following the ring through an arc of less than 90 degrees.

PREHENSION. When the handle of the *rattle* is touched to the child's hand, general activity of the arm is increased, and the hand either clenches or opens.

LANGUAGE AND SOCIAL BEHAVIOR. Usually no vocalizations are heard during the examination; if the infant vocalizes he makes small throaty noises. His facial expression is vacant and inattentive. Postural activity ceases when the *bell* is rung.

§ 2. NORMATIVE BEHAVIOR: 6 weeks

HEAD CONTROL. *Supine*, the head is still predominantly rotated to the side and more rarely than at 4 weeks assumes even briefly the midposition. *Pulled-to-sitting*, the head lags but not completely. *Supported sitting*, the head sags, and if it is held momentarily erect, as may be the case, it bobs. As the child is *lowered prone*, he holds his head in line with his body, resisting the pull of gravity. However, on *placement prone*, the head rotates resting on the platform and subsequently lifts to Zone 2. *Standing*, the head sags.

ARM-HAND POSTURE. This remains similar to that at 4 weeks; but in *supine*, one hand is less likely to open, and in *prone*, the hand is less likely to lift from the platform.

LEG-FOOT POSTURE. *Supine*, one leg is independently active. *Prone*, the legs are still flexed and adducted but they are also, at times, extended or semi-extended. *Standing*, the child supports no weight and his legs offer only slight resistance to the platform. He extends his legs for brief periods only.

REGARD. *Supine*, the infant definitely fixates his regard on objects, although he still stares at the window, wall, or other massive objects. He follows *moving persons* with regard. He looks at the *dangling ring* in the midplane. He also follows the ring with his eyes as it moves from the side toward and past the midplane; he then shifts his regard to the examiner. Presented with the *rattle*, however, he regards it only when it is shaken or is within his line of regard; instead he regards the examiner.

PREHENSION. The prehensory behavior, when the *rattle* is touched to the hand, is essentially similar to that of the 4 weeks old infant; the general activity of the arm is increased and the hand either clenches or opens. It is more characteristic of 6 weeks than of 4 or 8 weeks of age for the infant to retain the rattle throughout the period of observation.

LANGUAGE AND SOCIAL BEHAVIOR. The infant is reported now to show facial brightening when he regards a person's face, and to respond to social stimulation by smiling. In addition to making the small throaty noises reported at 4 weeks, he vocalizes such syllables as *ah*, *uh*, and *eh*.

§3. NORMATIVE BEHAVIOR: 8 weeks

HEAD CONTROL. *Supine*, the head is still predominantly rotated to the side. *Pulled-to-sitting*, the head lags only a little less than at 6 weeks. *Supported sitting*, the head sags but at times is held bobbingly erect or perhaps set forward. *Prone*, the head no longer rotates as the child is placed in position, but instead the midposition alignment is maintained. He erects his head, sometimes only momentarily, but at other times for a sustained interval. He lifts his head somewhat higher than at 6 weeks but still usually not beyond Zone 2. *Standing*, the head no longer sags forward but instead is held bobbingly erect or set forward.

ARM-HAND POSTURE. *Supine*, although the t-n-r arm posture is as prominent as at 6 weeks both arms are more likely to be flexed than they are at the earlier age. The fingers may be active when in contact with the body. *Prone*, the forearms are placed on the platform so that the child appears to be resting on them.

LEG-FOOT POSTURE. *Supine*, the infant now kicks; the extension of the legs, however, is brief. *Standing*, he supports at least a fraction of his weight. *Prone*, the legs are still flexed and adducted so that the infant tends to kneel.

BODY POSTURE AND PROGRESSION. *Prone*, the infant still rests on knees, abdomen, chest, and head. He flexes his legs, making crawling movements. As a result he may pivot slightly.

REGARD. The infant no longer stares at the window or wall, and his gaze is more alert than at 6 weeks; otherwise it is similar to that of the 6 weeks old infant.

PREHENSION. When the *rattle* is touched to the infant's hand, the hand no longer characteristically clenches; instead, the hand opens promptly and general activity increases. The rattle is now usually dropped immediately.

ADAPTATION. At the sound of the ringing *bell*, postural activity diminishes.

§4. NORMATIVE BEHAVIOR: 12 weeks

HEAD CONTROL. *Supine*, the head is still prevailingly rotated but the midposition is at times maintained. *Pulled-to-sitting*, the head lags, but less so than at younger ages; it lags moderately, slightly, or only initially.

Supported sitting, the head no longer sags but is held bobbingly erect or perhaps set forward. *Prone*, the head is no longer lifted merely momentarily but somewhat prolongedly. It is lifted higher than at 8 weeks but usually only to Zone 2. *Standing*, the head no longer bobs but instead is set forward or is held steadily erect.

ARM-HAND POSTURE. *Supine*, although the t-n-r posture is still prominent, the arms also assume a symmetrical position, the hands directed toward the midplane. The hands are predominantly closed but one hand is frequently open.

LEG-FOOT POSTURE. *Supine*, one leg no longer extends briefly but instead the infant kicks even more actively than at 8 weeks. *Prone*, the legs are no longer flexed and adducted, instead they are flexed in outward rotation. *Standing*, the infant's legs no longer offer only slight resistance to the platform, but continue to support at least a fraction of his weight. The toes are usually flexed as they are in contact with the platform and he usually lifts one foot.

BODY POSTURE AND PROGRESSION. *Prone*, the infant now rests on knees, abdomen, chest, and forearms. *Sitting*, his back is still uniformly rounded.

REGARD. *Supine*, the infant regards his hands. After delay he regards the *dangling ring* in the midplane prolongedly, shifting his regard to the examiner's hand. He follows the ring as it is slowly moved from side to side. He also shows some delay in regarding the *rattle* in the midplane; at times he regards it only when shaken or when it is in his line of vision. Seated in the *examining chair*, he regards the examiner's hand as the *cube* and as the *pellet* are presented. When the examiner's hand is withdrawn, the infant regards his own hand rather than the cube, and the table top rather than the pellet.

PREHENSION. When the *rattle* is touched to the infant's hand, his hand opens immediately; his response is now more localized and he no longer becomes generally active (as he did at 8 weeks). The rattle is retained by one hand for the period of observation. He is reported to clutch and to pull his dress.

SOCIAL BEHAVIOR. The infant is not only reported to smile but he actually smiles at the examiner during the *supine* situation. At home he is reported to coo and to "blow bubbles."

§ 5. NORMATIVE BEHAVIOR: 16 weeks

HEAD CONTROL. *Supine*, the head is no longer held prevailingly turned to the side, but instead maintains the midposition; the head also actively rotates, turning freely from one side to the other. *Pulled-to-sitting*, although the head still lags, it lags only initially or completely compensates. *Supported sitting*, the head is steadily erect. *Prone*, the head is lifted to Zone 3. *Standing*, the head is steadily erect and even compensates when the infant is swayed.

ARM-HAND POSTURE. *Supine*, the arms are symmetrical and predominantly flexed, frequently with forearms vertical. The hands may be brought together in contact with one another. One hand may be predominantly closed, or one or both hands may be predominantly open. *Prone*, the arms are no longer flexed close to the chest, and a hand is usually at some time lifted from the platform.

LEG-FOOT POSTURE. *Supine*, the legs are less active than at 12 weeks, kicking is usually not seen. *Prone*, the legs are more extended than at 12 weeks; they are usually flexed only at the knee, so that the infant rests on his thighs. *Standing*, the infant continues characteristically to lift his foot. He may even lift first one leg then another, making alternate stepping movements. His toes are usually not flexed while they are in contact with the platform. One foot may overlap the other.

BODY POSTURE AND PROGRESSION. *Pulled-to-sitting*, the back is no longer uniformly rounded but instead curves only in the lumbar region.

REGARD. The infant immediately regards the *dangling ring*; he also spontaneously regards the *rattle* as it is presented in the midplane. Usually, and most typically at this age, he stares at it. Presented with the *cube*, he regards it immediately though only momentarily; although he shifts his regard to his own hand, he recurrently regards the cube and gives it his predominate attention. The *pellet* in the standard position is not characteristically regarded; instead the infant regards the examiner, the examiner's hand, and the table top. But the pellet is usually regarded after it is moved to the near median position. The response however is very variable and usually is not repeated on replacement of the pellet. The regard for the *bell* and for the *cup* is recurrent. The regard for the *spoon* and also the *cup* is prolonged.

PREHENSION. Presented with the *dangling ring*, the infant approaches it with both hands but does not grasp it. He also promptly approaches the *cup* after it is moved to the near median position on the table, but dislodges it on contact. He does not approach the *first cube* but when it is placed in his hand he retains it nonchalantly, lifts it from the table top, and then drops it. While holding the *rattle* the infant brings it to his mouth, or having dropped the rattle he brings his hand to his mouth.

ADAPTATION. The infant now is reported to turn his head to the sound of a noise and to anticipate feeding when he sees either the breast or the bottle. He also is reported to stare at strangers, adjusting to them more slowly than formerly.

LANGUAGE AND SOCIAL BEHAVIOR. The infant is reported (or observed) to turn his head at the sound of a voice and to gurgle and laugh in play.

§ 6. NORMATIVE BEHAVIOR: 20 weeks

HEAD CONTROL. *Pulled-to-sitting*, the head no longer lags but instead is held in line with the body or is lifted forward. *Sitting in chair*, the head is turned freely. *Supported sitting*, the head is steadily erect. *Free sitting*, the head is held erect when the child leans forward.

ARM-HAND POSTURE. *Supine*, the hands are no longer closed but instead are predominantly open; the arms are freer from the body than they were at 16 weeks. *Prone*, the arms at some time are extended. The child also scratches the platform as he alternately flexes and extends his fingers.

LEG-FOOT POSTURE. *Standing*, the feet are not so likely to engage as they do at 16 weeks, and there is less tendency to lift one foot. Instead the legs extend recurrently and the child, momentarily at least, supports a large fraction of his weight.

BODY POSTURE AND PROGRESSION. *Sitting supported*, the body is erect, but when *unsupported* the child leans forward passively, although he keeps the head erect.

REGARD. Lying supine, the child regards the *rattle* in his hand. Presented with the *cube* he is less likely than at 16 weeks to shift his regard from the cube to his hand. Although he definitely regards the *pellet* rather than the examiner's hand or his own hand (regard may be confirmed by re-presenting

pellet), his regard tends to be delayed, momentary, and recurrent. However, some infants regard the pellet prolongedly.

PREHENSION. The child now approaches the *dangling ring* promptly; he also approaches the *rattle* with both hands, arms flexed but less flexed than at 16 weeks. The *dangling ring* is grasped in the midline; the *rattle* is grasped when it is moved near the hand. The child scratches the *table top*, approaches the *first cube*, the *spoon*, and the *bell*. He approaches the *cup* even in the standard position. He also dislodges some of the *massed cubes*. He drops the *dangling ring* but retains the *single cube* briefly, lifting it from the table.

MANIPULATION AND ADAPTATION. He brings the *dangling ring* to his mouth. Not only does he turn his head to the sound of a *voice*; he turns his head on hearing the *ringing bell*, but he does not necessarily turn to the correct side.

§ 7. NORMATIVE BEHAVIOR: 24 weeks

HEAD CONTROL. *Sitting in the chair*, the head turns freely.

ARM-HAND POSTURE. *Prone*, although his arms are still somewhat flexed, the infant rests on hands rather than on forearms.

LEG-FOOT POSTURE. When the child is *supine*, the legs are still flexed and outwardly rotated. When held *standing* the legs no longer extend recurrently; instead the infant holds the legs extended and supports a large fraction of his weight.

BODY POSTURE AND PROGRESSION. *Prone*, the infant rests on thighs, abdomen, chest, and hands, rather than on forearms as he did at 20 weeks; he *sits unsupported*, at least briefly.

REGARD. The infant consistently regards the *rattle*, *dangling ring*, *spoon*, *cup*, *bell*, and *first cube*. If the *rattle* is dropped it is visually pursued. He usually regards the *pellet* immediately on presentation although more infants at this age than at any other age regard the pellet only after delay; his regard may shift from the pellet, but if so he recurs to it; he may also regard it prolongedly. He inspects the *massed cubes*, shifting his regard from one cube to another.

PREHENSION. The infant at this age promptly approaches the *rattle* and grasps it; when he drops it, he attempts to resecure it. Sitting at the table he grasps the *first cube* and also the *second cube*; he approaches the

pellet but does not grasp it. When the *massed cubes* are presented, he reaches toward the screen. He approaches promptly and grasps the *cup*, *spoon*, and *bell*. One hand leads in the approach to the *pellet* and *bell*; in the case of the spoon it is usually the right hand. He still dislodges the *cup* and the *massed cubes* as he reaches toward them and contacts them. He holds the *round block* when it is given to him, and he attempts to resecure it when it is placed in the *formboard* hole. The infant no longer drops the *dangling ring* but he does drop the *rattle*; when the rattle is dropped or when it is placed beyond his reach, he strains toward it. He also drops *one cube* as another is presented, and he drops almost immediately a cube seized from the *massed cubes*. If he grasps the *bell*, he drops that. However, for a brief time he does hold a *cube* in each hand and he also retains the *block of the formboard*.

MANIPULATION AND ADAPTATION. He manipulates the *single cubes* on the table top and also lifts from the table, a *cube*, the *spoon*, and the *bell*. The *cube*, *spoon*, and *bell* as well as the *round block* are brought to the mouth. The infant now turns his head, in correct orientation to the *bell* when it is sounded.

§ 8. NORMATIVE BEHAVIOR: 28 weeks

HEAD CONTROL. In *supine*, the child may lift his head forward, apparently in an effort to sit. In *prone*, the head is tilted back to Zone 4.

ARM-HAND POSTURE. When *prone*, the infant may lift his arms, reaching forward, although they are still flexed.

LEG-FOOT POSTURE. *Supine*, the legs are no longer flexed and outwardly rotated but instead are extended and lifted from the platform. *Prone*, the legs are extended or semi-extended, flexed only at the knees, with abdomen and thigh resting on the platform. *Standing*, the infant supports a large fraction of his weight more than momentarily.

BODY POSTURE AND PROGRESSION. When *pulled-to-sitting* the infant assists the examiner by holding arms flexed and straining forward; *sitting*, the infant's body is momentarily erect, although he tends to lean forward.

REGARD. The infant now regards the *string* of the *dangling ring*; he also consistently regards the *pellet*.

PREHENSION. He approaches the *rattle* and *dangling ring* with one hand. Sitting in the chair before the table top he reaches for the *third cube* or for

any cube which is beyond his reach; he approaches the *cup* with both hands, selecting the cup handle for grasp. He approaches the *pellet* promptly, opening and closing his hand, scratching at the pellet but usually without securing it. If he does grasp it, he drops it. As he approaches the *bell*, he inverts his hand adaptively, preparatory to grasping it. He grasps the *cube* with his thumb partially opposed to his fingers. He pushes at the *round block* when it is inserted in the *formboard* hole. The infant now retains the *rattle* and *dangling ring* for the entire period of observation. He also retains the *first cube* as the *second* is presented and after it is grasped. But when the *third cube* is presented he usually drops the two which he is holding. The *rattle*, *dangling ring*, *cube*, *spoon*, and *bell* are successfully transferred from one hand to the other.

MANIPULATION. The *cup* is now lifted from the table top. The tendency to carry objects to the mouth continues. The *first cube*, the *cup*, a cube of the *massed cubes* and even the infant's foot are usually mouthed. The *pellet* and a cube of the *second cube* and *third cube* situation are still manipulated on the table top. The *bell* is manipulated by holding it with fingers encircling the handle. One of the consecutive cubes and the bell are hit or banged against the table top.

§ 9. NORMATIVE BEHAVIOR: 32 weeks

ARM-HAND POSTURE. *Supine*, the arms are extended at the side of the body or footward.

LEG-FOOT POSTURE. *Supine*, the legs are still extended and lifted so that the foot may be grasped and mouthed. *Standing*, braced with the examiner's hands at the sides of the trunk under the arms, the infant supports his entire weight.

BODY POSTURE AND PROGRESSION. *Sitting*, the infant leans forward passively, although he sits erect for a brief period. *Standing*, he supports his entire weight, although he leans forward with considerable hip flexion. *Prone*, the infant pivots.

REGARD. The infant's regard is more consistent and the attention span is wider than at 28 weeks.

PREHENSION. The infant now characteristically uses only one hand in reaching for a *cube*; the *bell* is usually grasped in the right hand. Both the *pellet* and the *string of the ring* are grasped. The *pellet* is secured by draw-

ing it against the palm with the fingers. Although the *spoon* is usually secured by encircling it with the fingers, the infant may secure it between thumb and fingers. He removes the *round block* from the *formboard* by pulling; in his attempt to secure the block he may scratch at it. In his manipulation he characteristically drops the *spoon*; likewise the *cup*. He may drop the *pellet*, and if he does so, he drops it immediately. He retains the same objects mentioned at 28 weeks; he also holds two cubes at some time during the *massed cube* situation.

MANIPULATION AND ADAPTATION. In his manipulation of the *massed cubes* he drops one cube and grasps another. He lifts the *formboard*, mouths the *ring* of the *ring and string*, and after demonstration waves the *bell* in an adaptive manner.

LANGUAGE. He vocalizes "da," and tends to repeat two syllables in his vocalizations such as "da da," or "mu mu."

§ 10. NORMATIVE BEHAVIOR: 36 weeks

LEG-FOOT POSTURE. *Standing*, supported at the sides of the trunk under the arms, the infant stands on his toes.

BODY POSTURE AND PROGRESSION. Instead of passively leaning forward when he is placed *sitting*, he may lean forward actively and again erect himself. *Standing*, he still leans forward at the hips as he supports his entire weight.

REGARD. He visually pursues a cube of the *massed cubes* which is dropped to the platform or floor. In the *ring and string* situation he regards the *ring* rather than the *string* as he approaches and pulls the *string*. Given the *pellet and bottle*, he attends only to the *bottle*.

PREHENSION. The infant now approaches as well as grasps the *bell* with the right hand. However, the majority of infants at this age grasp the *spoon* in the left hand. The infant now grasps the *third cube* and also the *round block* after he has removed it from the *formboard* hole where the examiner has placed it. He is more dextrous in securing the *pellet* than he was at 32 weeks; his thumb opposes his fingers in prehending it. After grasping the *pellet*, he drops it, although not immediately as he did at 32 weeks. Presented with the *cup and spoon* he grasps one, hold it, and secures the other.

MANIPULATION AND ADAPTATION. The infant secures the *ring* by use of the string; combines *two cubes* when they are presented one at a time; and in the *cup and spoon* situation hits or bangs either one or the other on the table top. He also waves but does not necessarily ring the *bell*. *LANGUAGE.* He vocalizes the sound "ma" or "mu" and adjusts to words such as "Where is the _____?" or "bye-bye."

§ 11. NORMATIVE BEHAVIOR: 40 weeks

ARM-HAND POSTURE. *Pellet*, is approached with the index finger.

LEG-FOOT POSTURE. *Prone*, the infant flexes his leg drawing up his knee. *Standing*, there is no longer marked flexion at the hips.

BODY POSTURE AND PROGRESSION. The infant now can escape from the *supine* position by rolling prone or by raising himself to sitting. In both instances he raises head and shoulders from the platform preparatory to attaining the prone or sitting posture. *Prone*, he flexes his leg, drawing the knee forward, although he does not yet assume a full creeping position. He rests on thighs, abdomen, chest, and hands; while in this position he pushes with his hands and regresses as a result. *Standing*, he no longer leans forward with flexion at the hips, but instead supports himself by holding the crib side rail. From *sitting* he attains the prone position. From *prone* he attains supine or sitting.

REGARD. The infant now regards the *bell* clapper; he also regards the *pellet* as it is dropped into and after it is dropped out of the bottle, but while it is in the bottle he gives predominant attention to the bottle. While manipulating the *massed cubes* he visually pursues a cube which falls to the platform or floor.

PREHENSION. The infant now approaches a *cube* with a cube in hand. As he reaches toward the *pellet* he holds his index finger pointed toward it and grasps the pellet with independent thumb-index flexion. At times, however, he grasps the pellet by drawing it against the palm with his fingers. He now pushes rather than pulls the *round block* out of the *formboard*. As the *third cube* is presented he drops one cube which he is holding; in the *massed cubes* situation, however, he holds one cube and grasps another. He grasps the screen concealing the *massed cubes*. In the *cup and cubes* situation he holds two cubes. He transfers the *bell* frequently. After demonstration of insertion he releases the *block* on the *formboard*.

MANIPULATION AND ADAPTATION. Prior to demonstration the *block* is brought to the *formboard*. The *cup* is now lifted when presented with the *cubes* as well as when presented with the *spoon* (36 weeks behavior); however, considerable attention is given to the cubes and when a cube is dropped the infant usually regrasps it or grasps another cube. He manipulates the *pellet* on the table top; he may poke it about with his index finger. In the *cup and spoon* situation he mouths the cup and hits or bangs it on the table top. The *scribble demonstration* does not yet usually evoke application of the crayon to the paper. Instead, the infant mouths the crayon and manipulates the paper. If he brings the crayon to the paper, he strikes rather than rubs it on the paper. *Cup and spoon* are combined only after demonstration of rattling the spoon in the cup. A tendency spontaneously to combine objects is emerging, since the infant usually combines either two cubes or a cube and the cup as he plays with the *cup and cubes*. Mouthing is still prominent. He may bring the *round block*, the small glass *bottle*, the *red crayon*, and a single *cube* or one of the *massed cubes* to his mouth. He waves the *bell*, holding it so that it rings. The scope of his activity is widening, since he now occasionally brings the *ring and string* and the *formboard* to the platform.

LANGUAGE AND SOCIAL BEHAVIOR. He typically waves bye-bye either in response to gesture or verbal command. He also smiles at his *mirror image*.

§ 12. NORMATIVE BEHAVIOR: 44 weeks

BODY POSTURE AND PROGRESSION. *Prone*, the infant no longer rests on his thighs and abdomen but instead he assumes a creeping position. He progresses, but as he does so his trunk may still drag on the platform. He pushes himself up from *prone* into the sitting position and with slight assistance can pull himself from *sitting* to standing.

REGARD. Presented with the *single cubes*, the infant usually shifts his regard to the examiner; presented with the *pellet and bottle*, he now regards the pellet although he still gives predominant attention to the bottle.

PREHENSION. The majority of the infants now use the right hand in approaching the *cube* and the *pellet*. The thumb and index finger are used in grasping the *bell*; it is characteristic of this age for the infant to grasp the top of the bell handle. The infant now retains the *pellet* after grasping

it. He tends to hold two cubes, one in each hand in the *cup and cubes* situation. In both the *first* and *second cube* situations, he transfers a cube from one hand to the other. He releases an object which he is holding when asked by the examiner to surrender it. He still pulls at the *block* in the *formboard*.

MANIPULATION AND ADAPTATION. There is less mouthing of objects than at 40 weeks; he no longer mouths a *cube* unless it is the only object which he is given. Neither does he mouth the small glass *bottle*, the *red crayon*, nor the *block*. He does, however, mouth the *bell*, and either the *cup* or *spoon* when they are presented together. In addition to mouthing the *bell* he pokes at the clapper. He shows a greater tendency than at 40 weeks to combine objects; he combines two of the *massed cubes*, spontaneously hits the block on the *formboard*, and, after demonstration, marks with the crayon on one sheet of paper. He also spontaneously places the *spoon* in the *cup*. Demonstration modifies his behavior as shown by the fact that he is likely to wave or ring the bell only after demonstration.

LANGUAGE AND SOCIAL BEHAVIOR. He adjusts to "give it to me" by releasing an object when the examiner takes hold of it, although he does not yet place it in the examiner's hand. He also adjusts to other simple commands used in his daily care. He usually has acquired one "word" for his vocabulary. Vocal expressiveness is becoming more frequent; he vocalizes both during the *single cube* and the *cup and spoon* situations.

§ 13. NORMATIVE BEHAVIOR: 48 weeks

BODY POSTURE AND PROGRESSION. *Sitting*, he pivots; from sitting he attains a creeping or quadrupedal position. Unaided, he pulls himself to *standing*; *prone*, he creeps. *Standing*, the infant lifts a foot while supporting his entire weight; he cruises sidewise, holding on the crib rail. He may even walk forward if both hands are held.

REGARD. Given the *pellet and bottle*, he attends predominantly to the pellet and perceives the disappearance of the pellet from the bottle. He also attends simultaneously to both *cup and cubes*.

PREHENSION. The infant now grasps the *pellet* promptly. Presented with the *cup and spoon*, he reaches first for the spoon. In removing the block from the *formboard* he pulls or picks it out; he does, however, also resort to the more immature method of pushing the block from the hole.

He throws or rolls the ball to the examiner during *ball play*. He may also show a throwing propensity by casting a cube while playing with the *cup and cubes*.

MANIPULATION AND ADAPTATION. Mouthing except in the case of the *bell* has largely disappeared. Poking of objects is even more prominent than at 44 weeks; he pokes not only at the *bell clapper*, but also at the *pellet in the bottle* and inserts his index finger into the *performance box* holes before the rod is offered to him. Combining behavior is more extensive and adaptive; he brings a *cube* over the *cup*; approaches the cube on the table top with the cube in his hand; inserts the rod in the *performance box* both before and after demonstration; and repeatedly brings the rod to the box after demonstration; he also releases the block on the *formboard* both before and after demonstration. Other characteristic activities include dangling the ring by the string, waving or ringing the bell even in the complicated *ring-string and bell* situation, and rolling or throwing the ball to the examiner in *ball play*.

§ 14. NORMATIVE BEHAVIOR: 52 weeks

BODY POSTURE AND PROGRESSION. *Standing*, the infant walks if support is given to one or both hands.

PREHENSION. When playing with the *massed cubes*, he is now able to retain a cube in one hand while he grasps one cube after another with the other hand. He immediately removes the block from the *formboard*. He releases a *cube* in the *cup* and, after demonstration, releases the rod at the *performance box* surface. When asked to surrender an object which he is holding he releases it in the examiner's hand. During *ball play* he now releases the ball with vigor, by a throwing thrust.

MANIPULATION AND ADAPTATION. The infant's behavior is becoming more discriminative. He so manipulates the *bottle* that the *pellet* falls out. He spontaneously combines the *crayon and paper*; after scribble demonstration he draws the crayon over the paper, giving evidence of induced behavior. Marks are left on the paper in at least two out of the three trials. After demonstration the infant directs his activity to the middle hole of the *performance box* and even inserts the rod in that hole. Although he may not release the rod he does give evidence of modifying his behavior in response to the demonstration. Rattling the *spoon in the cup*

also improves after the examiner's demonstration. Other exploitive behavior of this age includes transferring the cubes of the *consecutive cubes* to the platform, picking up several cubes, one by one, and releasing and resecuring a cube in the *cup and cubes* situation.

LANGUAGE AND SOCIAL BEHAVIOR. The infant now approaches his *mirror* image socially and even vocalizes. He is reported to try to attract attention vocally, to say two or more "words" and to respond to inhibitory words of others.

§ 15. NORMATIVE BEHAVIOR: 56 weeks

BODY POSTURE AND PROGRESSION. The infant can now *stand* alone at least momentarily; his parents report that at home he is beginning to achieve standing without using the furniture for support.

PREHENSION. He removes the *round block* from the *formboard* by fingering its edge or by a grasp which spans the diameter of the block. He shows an increased ability both to retain and to release objects. Holding a *cube* in one hand, he picks up and retains one cube after another with the free hand. Similarly, he now releases more than one *cube* in the *cup*. He releases the *pellet* over, although not necessarily in, the *bottle*. He also releases the rod in the *performance box* hole, lifts the *formboard* and releases it, and repeatedly releases the ball in *ball play* with the examiner.

MANIPULATION AND ADAPTATION. When the *pellet* alone is presented the infant puts it in his mouth. Manipulation is becoming more elaborate: after putting a few of the *cubes in the cup* he lifts it; he transports the *ring* to the crib platform; he combines the *pellet and bottle*; he also combines the *ring and the bell* by placing the bell within the ring or by putting the ring over the bell, as though reinstating the situation just presented to him. Combining behavior is more mature: As the *consecutive cubes* are presented, he places each cube on the table, a first step toward tower building; playing with the *massed cubes* he holds one cube while he picks up one cube after another with the free hand; he places three or more *cubes in the cup*, releasing more than one of them there, and then or later removes at least one cube from the cup. Spontaneously the infant applies a crayon to the *paper*, making linear marks; after demonstration the only marks which he makes on the paper are linear. Also after demonstration he rattles the *spoon in the cup*; he brings the rod to the middle

hole of the *performance box* and releases it there; he almost inserts the block in the *formboard*; and he repeatedly combines the *paper* and *crayon*.

LANGUAGE AND SOCIAL BEHAVIOR. The infant now says three "words" or more; he also responds to the spoken word *shoe* by looking for and then staring at the shoe. When presented with the *mirror* he brings his face close to his image, sometimes kissing it.

§ 16. PHOTOGRAPHIC DELINEATION OF MATURITY LEVELS

The use of the pictorial *Atlas* and cinema records of child development for a visualization of age characteristics has already been suggested. The loose leaf construction of *An Atlas of Infant Behavior* makes it possible for the student to assemble the delineations of any given age level for a series of normative (and also naturalistic) situations. The pagination of the *Atlas* is based upon developmental sequences for individual situations. The order of pagination reproduced below may be used as a key to recodify these delineations on the basis of ages, that is, maturity levels.

An assembly of the illustrations for any one age provides a compact conspectus of the behavior which is characteristic of that particular level of maturity. A comparative inspection of adjacent levels of maturity helps to focus the judgment upon significant behavior factors.

A. PAGINATION OF THE LOOSE LEAVES OF THE ATLAS REBOOKED ACCORDING TO AGE LEVELS—NORMATIVE SERIES

- 4 weeks Pages: 50, 51, 92, 93, 159, 203, 243, 264, 265.
- 6 weeks Pages: 54, 55, 96, 97, 161, 205, 245, 267.
- 8 weeks Pages: 58, 59, 100, 101, 163, 207, 247, 269.
- 12 weeks Pages: 62, 63, 104, 105, 165, 209, 249, 271, 285, 327, 379.
- 16 weeks Pages: 66, 67, 107, 167, 212, 213, 251, 274, 275, 287, 307, 329, 342, 343, 381, 440, 441.
- 20 weeks Pages: 70, 71, 110, 111, 170, 171, 216, 217, 254, 255, 278, 279, 289, 307, 331, 346, 347, 383, 444, 445, 511.
- 24 weeks Pages: 74, 75, 114, 115, 174, 175, 257, 281, 291, 309, 333, 350, 351, 386, 387, 448, 449, 511.
- 28 weeks Pages: 78, 79, 117, 178, 179, 219, 260, 261, 283, 293, 309, 335, 353, 390, 391, 452, 453, 483, 511.
- 32 weeks Pages: 82, 83, 120, 121, 182, 183, 295, 309, 337, 355, 359, 369, 394, 395, 415, 456, 457, 486, 487, 501, 513.
- 36 weeks Pages: 85, 124, 125, 185, 222, 223, 297, 311, 339, 357, 359, 369, 398, 399, 417, 460, 461, 489, 505, 513.

- 40 weeks Pages: 88, 89, 128, 129, 148, 149, 188, 189, 299, 311, 361, 371, 402, 403, 420, 421, 464, 465, 491, 501, 507, 513, 519, 521.
- 44 weeks Pages: 132, 133, 192, 193, 226, 227, 301, 311, 315, 363, 373, 406, 407, 424, 425, 468, 469, 493, 501, 505, 507, 515, 519, 521.
- 48 weeks Pages: 136, 137, 152, 153, 196, 197, 230, 231, 303, 313, 318, 319, 365, 373, 409, 428, 429, 472, 473, 495, 503, 509, 515, 519, 521.
- 52 weeks Pages: 140, 141, 200, 201, 234, 235, 305, 313, 322, 323, 367, 375, 411, 432, 433, 476, 477, 497, 503, 505, 509, 517, 523.
- 56 weeks Pages: 156, 157, 237, 305, 325, 367, 377, 413, 436, 437, 480, 481, 499, 503, 505, 517, 519, 523.
- 60 weeks Pages: 144, 145, 240, 241, 313.

**B. PAGINATION OF THE LOOSE LEAVES OF THE ATLAS REBOOKED ACCORDING TO
AGE LEVELS — NATURALISTIC SERIES**

- 8 weeks Pages: 559, 561, 661, 805, 843, 861.
- 12 weeks Pages: 563, 565, 689, 807, 809, 841, 843, 861, 864, 865, 897.
- 16 weeks Pages: 557, 567, 569, 689, 785, 811, 845, 895, 897, 909.
- 20 weeks Pages: 572, 573, 575, 727, 729, 785, 813, 845, 897, 909.
- 24 weeks Pages: 577, 580, 581, 583, 586, 587, 663, 665, 667, 669, 671, 673, 675, 689, 731, 733, 735, 737, 739, 815, 841, 847, 895, 909, 911.
- 28 weeks Pages: 589, 592, 593, 595, 598, 599, 601, 741, 743, 745, 747, 749, 818, 819, 821, 823, 825, 847, 867, 869, 871, 873, 875, 877, 879, 881, 899, 911.
- 32 weeks Pages: 604, 605, 607, 610, 611, 613, 615, 659, 677, 679, 681, 683, 685, 687, 751, 753, 755, 757, 759, 761, 841, 849, 901, 913.
- 36 weeks Pages: 617, 620, 621, 623, 625, 627, 689, 693, 695, 697, 699, 763, 765, 767, 769, 771, 785, 827, 829, 831, 851, 883, 885, 887, 903, 913, 915.
- 40 weeks Pages: 629, 632, 633, 701, 723, 773, 775, 777, 785, 788, 789, 792, 793, 851, 859, 917.
- 44 weeks Pages: 636, 637, 639, 641, 703, 705, 707, 709, 711, 713, 715, 723, 834, 835, 905, 917.
- 48 weeks Pages: 641, 644, 645, 647, 779, 781, 783, 796, 797, 800, 801, 841, 853, 895, 905, 919.
- 52 weeks Pages: 717, 720, 721, 723, 837, 839, 855, 889, 891, 893, 907, 921.
- 64 weeks Pages: 691
- 68 weeks Pages: 723
- 72 weeks Pages: 895
- 80 weeks Pages: 649, 652, 653, 656, 657, 857.
- 104 weeks Pages: 725, 803, 921.

CHAPTER IX

FUNCTIONAL SYLLABUS

IN the genetic analysis of infant behavior any observed behavior pattern or behavior episode may be considered from three different points of view: (1) as a response to a specific situation; (2) as an indicator of a functional capacity; (3) as an ontogenetic behavior value characteristic of a certain level of maturity.

The preceding chapters have presented the normative values of behavior classified by situations and maturity levels. The present chapter codifies the behavior values in relation to functional fields or capacities. Behavior items of similar import occurring in diverse situations are collated under more or less general "functional" categories. It is not assumed that even such a well defined field of behavior as prehension is a separate entity in the infant's make-up. However, for reasons both anatomical and functional, certain behaviors fall into natural developmental groupings.

The functional syllabus here presented was drawn up to facilitate analysis and interpretation in those instances in which the behavior picture is markedly irregular or atypical. Behavior items have been tabulated for seven different functional categories, namely: (1) *Specific Postural Activity*, (a) head, (b) arm-hand, (c) leg-foot, (d) foot; (2) *Gross Postural Activity*, (a) locomotion, (b) arising, (c) general activity; (3) *Regard*, (a) focus, (b) type, (c) extent; (4) *Prehension*, (a) approach and handedness, (b) grasp, (c) retention and release; (5) *Manipulation*; (6) *Adaptation*; (7) *Language and Social Behavior*, (a) expression, (b) comprehension.

The functional syllabus seriates the behavior items in the order of genetic sequence and in relation to age. There are five columns opposite each item. The middle or third column contains two figures: the first designates the critical age¹ for the item under consideration; the second, the quartile value² for

¹ For increasing items the critical age is the *first* age at which an item reaches the fifty percentile; for decreasing items the critical age is the *last* age at which an item is still in the fifty percentile; for focal items the critical age is the *focal* age.

² 1 first quartile, 0 to 25 percentage value

2 second " , 25 to 50 "

3 third " , 50 to 75 "

4 fourth " , 75 through 100 percentage value

the critical age. The two following columns give the quartile values for the two successive age levels; the two preceding columns give the quartile values for the two preceding age levels. Thus, by glancing across the row, one can tell the critical age of the behavior and its trend, i.e., whether the item decreases, increases, or is focal. For example Section 1 (a) item *SiP 1, Head lags*, is a decreasing item; it is frequent behavior from 8 through 16 weeks; the critical age is 16 weeks; thereafter it decreases rapidly, showing second quartile frequency at 20 weeks and only first quartile frequency at 24 weeks.

§ 1. SPECIFIC POSTURAL ACTIVITY

		CRITICAL AGE				
(a) HEAD						
<i>Supine</i>						
Su 3	Head in midposition only momentarily	—	—	4 : 2	1*	2*
Su 1	Head predominantly rotated	4*	4	12 : 4	1	0
Su 2	Head predominantly rotated to same side.	3*	4	12 : 4	2	0
Su 4	Head maintains midposition	2*	2	12 : 3	4	4
Su 7	Rotates head from one side to the other	2	2	16 : 3	+	+
Su 5	Head predominantly in midposition	1	1	16 : 3	+	+
Su 8	Lifts head	1	2	40 : 3	+	+
<i>Pulled-to-sitting</i>						
SiP 2	Head lags completely	—	—	4 : 2	1*	1*
SiP 7	Head lags initially only	—	—	4 : 2	1*	1*
SiP 4	Head lags markedly	1*	1*	8 : 2	1	1
SiP 3	Head lags completely or markedly	2*	2	12 : 2	1	1
SiP 5	Head lags moderately, slightly, or only initially	2*	2	12 : 3	3	2
SiP 6	Head lags moderately or slightly	1*	2	12 : 2	2	1
SiP 1	Head lags	4	4	16 : 4	2	1
SiP 8	Head compensates or lags only initially	1	2	16 : 3	4	4
SiP 9	Head compensates	1	2	20 : 3	4	4
<i>Sitting in Chair</i>						
SiC 2	Head erect and steady	0	2	20 : 3	4	4
SiC 3	Head turns freely	0	1	24 : 3	4	+
<i>Sitting</i>						
Si 2	Head only momentarily erect	—	2*	6 : 2	1*	0
Si 1	Head sags	3*	3*	8 : 3	1	0
Si 3	Head bobbingly erect	1*	2*	8 : 3	3	1
Si 4	Head set forward	1*	2	12 : 2	2	1
Si 5	Head steadily erect	0	1	16 : 3	3	4
Si 6	Head erect when leans forward	1	1	20 : 3	3	3
<i>Prone</i>						
Pr 2	(Placement) Head rotates	—	3*	6 : 3	2*	1
Pr 7	Head lifts to Zone 2	—	2*	6 : 4	4*	4
Pr 1	(Ventral suspension) Head compensates	—	1*	6 : 3	3*	4
Pr 4	Lifts head momentarily	3*	3*	8 : 3	1	1
Pr 3	(Placement) Head in midposition	2*	2*	8 : 3	4	4
Pr 5	Holds head lifted sustainedly	1*	2*	8 : 3	3	3
Pr 8	Lifts head to Zone 3	1	2	16 : 3	4	4
Pr 9	Lifts head to Zone 4	1	2	28 : 3	3	+

* Two-week interval.

— No data.

0 Behavior did not occur.

+ Increasing trend.

§ 1. SPECIFIC POSTURAL ACTIVITY—Continued

										CRITICAL AGE	
(a) HEAD—Continued											
<i>Standing</i>											
St 3	Head erect only momentarily	.	.	.	.	.	.	.	.	4 : 2	1*
St 2	Head extends	.	.	.	.	.	.	.	.	4 : 1	1*
St 1	Head sags	.	.	.	.	.	.	.	.	6 : 3	2*
St 4	Head sags or erect only momentarily	.	.	.	.	.	.	.	.	6 : 3	2*
St 6	Head bobbingly erect	.	.	.	.	.	.	.	.	8 : 2	1
St 5	Head bows or set forward	.	.	.	.	.	.	.	.	8 : 3	2
St 7	Head set forward	.	.	.	.	.	.	.	.	12 : 2	2
St 8	Head set forward or steadily erect	.	.	.	.	.	.	.	.	12 : 4	0
St 9	Head steadily erect	.	.	.	.	.	.	.	.	16 : 3	+
St 10	Head compensates when swayed	.	.	.	.	.	.	.	.	16 : 4	+
(b) ARM-HAND											
<i>Supine</i>											
Su 9	Arms prominently in t-n-r position	.	.	.	.	.	.	.	.	12 : 3	2
Su 12	Arms symmetrical	.	.	.	.	.	.	.	.	12 : 3	0
Su 13	Arms prominently symmetrical	.	.	.	.	.	.	.	.	16 : 3	+
Su 14	Arms extended laterally or flexed, forearm vertical	.	.	.	.	.	.	.	.	16 : 3	+
Su 34	Hands in contact, arms flexed	.	.	.	.	.	.	.	.	16 : 2	1
Su 17	Arms predominantly flexed	.	.	.	.	.	.	.	.	16 : 3	2
Su 24	Arm ex. at side of body or directly footward	.	.	.	.	.	.	.	.	32 : 3	—
Su 28	Hands predominantly closed	.	.	.	.	.	.	.	.	12 : 3	—
Su 29	Hand predominantly open	.	.	.	.	.	.	.	.	12 : 3	+
Su 27	Hand predominantly closed	.	.	.	.	.	.	.	.	16 : 3	2
Su 30	Hands predominantly open	.	.	.	.	.	.	.	.	20 : 3	+
<i>Prone</i>											
Pr 23	Rests on forearms	.	.	.	.	.	.	.	.	8 : 3	4
Pr 12	Arms flexed, close to chest	.	.	.	.	.	.	.	.	12 : 3	2
Pr 14	Lifts hand	.	.	.	.	.	.	.	.	16 : 3	—
Pr 13	Arms extended	.	.	.	.	.	.	.	.	20 : 3	3
Pr 24	Rests on hands	.	.	.	.	.	.	.	.	24 : 3	4
Pr 11	Arms flexed	.	.	.	.	.	.	.	.	28 : 3	1
Pr 15	Lifts arm and hand	.	.	.	.	.	.	.	.	28 : 2	1
Pr 16	Scratches platform	.	.	.	.	.	.	.	.	20 : 3	1
<i>Pellet</i>											
P 22	Approaches with index finger extended	.	.	.	.	.	.	.	.	40 : 3	1
(c) LEG-FOOT											
<i>Supine</i>											
Su 47	One leg independently active	.	.	.	.	.	.	.	.	6 : 3	3*
Su 43	Leg extends briefly	.	.	.	.	.	.	.	.	8 : 3	2
Su 52	Kicks	.	.	.	.	.	.	.	.	8 : 3	2
Su 42	Legs flexed, outwardly rotated	.	.	.	.	.	.	.	.	24 : 3	2
Su 45	Legs extended and lifted more than briefly	.	.	.	.	.	.	.	.	28 : 3	2
<i>Prone</i>											
Pr 21	Legs extended or semi-extended	.	.	.	.	.	.	.	.	6 : 3	4
Pr 17	Legs flexed and adducted (kneels)	.	.	.	.	.	.	.	.	8 : 3	1
Pr 36	Flexes legs in crawling movements	.	.	.	.	.	.	.	.	8 : 3	1
Pr 19	Legs flexed, outwardly rotated	.	.	.	.	.	.	.	.	12 : 3	2
Pr 20	Legs flexed only at knees	.	.	.	.	.	.	.	.	16 : 3	3
Pr 37	Flexes leg drawing up knee	.	.	.	.	.	.	.	.	40 : 3	—

§ 1. SPECIFIC POSTURAL ACTIVITY—Continued

						Critical Age
(c) LEG-FOOT—Continued						
<i>Standing</i>						
St 11	Legs flexed, do not extend			—	—	4 .3
St 16	Supports no weight			—	4*	6 .3
St 12	Legs extend briefly			—	2*	6 .3
St 17	Offers very slight resistance			3*	3*	8 .3
St 18	Supports a fraction of weight			1*	2*	8 .3
St 32	Lifts foot without supporting entire weight			1*	2	12 .3
St 19	Supports a large fraction of weight			2	1	20 .3
St 13	Legs extend recurrently			1	2	20 .3
St 20	Supports a large fraction of weight more than momentarily			2	2	28 .3
St 21	Supports entire weight			2	2	32 .3
St 14	Hips flex, legs flex or extend			3	3	36 .3
St 33	Lifts foot while supporting entire weight			2	2	48 :3
(d) FOOT						
<i>Standing</i>						
St 24	Toes flex			4*	4	12 :3
St 22	One foot engages the other			1	1	16 .2
St 27	Stands on toes			1	2	36 .3

§ 2. GROSS POSTURAL ACTIVITY

						Critical Age
(a) LOCOMOTION						
<i>Prone</i>						
Pr 36	Flexes legs in crawling movements			—	4*	6 .4
Pr 38	Pivots			2	2	32 :3
Pr 37	Flexes leg drawing up knee			2	2	40 .3
Pr 39	Regresses			1	1	40 .2
Pr 40	Progresses			1	2	44 .3
Pr 42	Creeps			2	2	48 .3
<i>Sitting</i>						
Si 35	Attains prone			1	2	40 .3
Si 37	Attains creeping or quadrupedal position			1	2	48 .3
Si 34	Pivots			2	2	48 :3
<i>Standing</i>						
St 34	Stepping movements not supporting weight			1*	1	12 .2
St 32	Lifts foot without supporting entire weight			2	3	16 .3
St 46	Cruises or walks using support			1	2	48 .3
St 48	Walks only when both hands supported			1	1	48 :2
St 47	Walks using support			1	2	52 .3
St 44	Attains standing independently (r)			1	2	56 :2
(b) ARISING						
<i>Pulled-to-sitting</i>						
SiP 1	Head lags			4	4	16 :3
SiP 12	Pulled easily			—	2	20 :3
SiP 13	Assists Examiner by pulling self forward			1	2	28 :3

§ 2. GROSS POSTURAL ACTIVITY—Continued

						Critical Age
(b) ARISING—Continued						
<i>Supine</i>						
Su 8	Lifts head	.	1	2	40 : 3	—
Su 53	Lifts head and shoulders	.	1	1	40 : 3	—
Su 63	Rolls to prone or attains sitting	.	2	2	40 : 3	—
<i>Prone</i>						
Pr 1	(Ventral suspension) Head compensates	.	—	1*	6 . 3	3* . 4
Pr 25	Rests only on knees, abdomen, chest, head	.	4*	3*	8 . 3	1 . 1
Pr 5	Holds head lifted sustainedly	.	1*	2*	8 . 3	3 . 3
Pr 26	Rests only on knees, abdomen, chest, forearms	.	1*	2	12 . 3	1 . 0
Pr 29	Rests only on thighs, abdomen, chest, hands	.	3	3	40 . 3	2 . 2
Pr 31	Assumes creeping position	.	1	2	44 . 3	3 . 4
Pr 44	Pushes upward and backward to sitting	.	1	2	44 . 3	4 . 4
<i>Sitting</i>						
Si 1	Head sags	.	3*	3*	8 . 3	1 . 0
Si 8	Back rounded uniformly	.	4*	3	12 . 3	1 . 1
Si 9	Back lumbar curvature	.	2	2	16 . 3	— . —
Si 5	Head steadily erect	.	0	1	16 . 3	4 . 4
Si 10	Body erect, supported	.	0	2	20 . 3	3 . 4
Si 29	Sits unsupported	.	1	2	24 . 3	4 . 4
Si 28	Sits leaning forward	.	2	2	28 . 3	2 . 2
Si 11	Body erect	.	1	2	28 . 3	3 . 4
Si 24	Leans forward passively	.	3	3	32 . 3	2 . 1
Si 32	Erects self from leaning forward	.	2	2	36 . 4	4 . 4
<i>Standing</i>						
St 11	Legs flexed, do not extend	.	—	—	4 . 3	2* . 2*
St 1	Head sags	.	—	—	4 . 3	2* . 2*
St 16	Supports no weight	.	—	4*	6 : 3	2* . 2
St 17	Offers very slight resistance	.	3*	3*	8 : 3	2 . 2
St 18	Supports a fraction of weight	.	1*	2*	8 : 3	3 . 3
St 9	Head steadily erect	.	1	2	16 . 3	— . —
St 19	Supports a large fraction of weight	.	2	2	28 . 3	4 . 4
St 21	Supports entire weight	.	2	2	32 : 3	4 . 4
St 14	Hips flex, legs flex or extend	.	3	3	36 . 3	2 . 2
St 39	Stands holding side rail	.	1	2	40 . 3	3 . 3
St 41	Attains standing with E.'s assistance or independently	.	2	2	44 . 3	4 . 4
St 43	Pulls to standing holding side rail or independently	.	2	2	48 . 3	3 . 4
St 40	Stands independently (without support)	.	1	2	56 . 3	— . —
St 44	Attains standing independently (r)	.	1	2	56 . 3	— . —
(c) GENERAL ACTIVITY						
CC 54	Postural activity	.	—	1	40 : 3	3 . 3
B 74	Postural activity	.	1	2	44 : 3	2 . 2
Cp-C50	Postural activity	.	1	2	52 . 3	1 . —
M 10	Postural activity	.	2	2	52 . 3	3 . —
R-S 37	Postural activity	.	2	2	52 : 3	3 . —
CM 64	Postural activity	.	2	2	56 : 3	— . —
F 62	Postural activity	.	2	2	56 : 3	— . —
Ct 5	Postural activity	.	1	1	56 : 3	— . —

§ 3. REGARD

						Critical Age
(a) FOCUS						
<i>Supine</i>						
Su 64	Stares vacantly	.	.	.	.	—
Su 66	Stares at window or wall	.	.	.	.	4*: 3
Su 65	Fixates definitely	.	.	.	.	6*: 3
Su 69	Facial expression attentive	.	.	.	.	6*: 4
						—
<i>Social</i>						
so 2	Visually pursues moving person	.	.	.	.	1*
<i>Personal</i>						
per 1	Regards hands	.	.	.	.	1*
						1
<i>Dangling Ring</i>						
RD 6	Disregards in midplane	.	.	.	.	—
RD 7	Regards in midplane	.	.	.	.	2*
RD 17	Follows past midplane	.	.	.	.	6*: 3
RD 20	Follows approximately 180°	.	.	.	.	2*
						12: 3
<i>Rattle</i>						
Ra 13	Regards Examiner	.	.	.	.	2*
Ra 12	Regards surroundings	.	.	.	.	3*: 4
Ra 2	(If regards) regards only in line of vision or when shaken	.	.	.	.	12: 3
Ra 5	Regards in midplane (spontaneously or after shaken)	.	.	.	.	3*: 3
Ra 8	Regards spontaneously in midplane	.	.	.	.	12: 3
Ra 15	Regards rattle in hand	.	.	.	.	2
						16: 3
<i>Cubes</i>						
CC1 14	Regards Examiner's presenting hand	.	.	.	.	20: 4
CC1 15	Regards hand	.	.	.	.	1
CC1 3	Regards cube	.	.	.	.	16: 3
CC1 13	Regards predominantly	.	.	.	.	2
CM 12	Pursues visually to platform or floor	.	.	.	.	16: 4
				.	.	36: 3
<i>Pellet</i>						
P 13	Regards Examiner	.	.	.	.	12: 3
P 15	Regards table top	.	.	.	.	12: 3
P 14	Regards Examiner's hand	.	.	.	.	4
P 16	Regards hand	.	.	.	.	16: 3
P 1	Regards (s.m p. or n m p.)	.	.	.	.	2
P 2	Regards with definite fixation	.	.	.	.	16: 3
			.	.	.	20: 4
<i>Pellet and bottle</i>						
P-Bo 19	Attends to bottle only	.	.	.	.	3
P-Bo 21	Regards pellet after dropped from bottle	.	.	.	.	40: 3
P-Bo 1	Regards pellet as dropped in bottle	.	.	.	.	40: 4
P-Bo 3	Attends predominantly to bottle	.	.	.	.	44: 3
P-Bo 2	Regards pellet in bottle	.	.	.	.	44: 3
P-Bo 4	Attends predominantly to pellet	.	.	.	.	48: 3
			.	.	.	4
(b) TYPE						
<i>Stares</i>						
Su 64	Stares vacantly	.	.	.	.	4: 3
Su 66	Stares at window or wall	.	.	.	.	6: 3
Ra 10	Regards starily	.	.	.	.	12: 3
			.	.	.	1
<i>Regards momentarily</i>						
RD 3	Regards momentarily	.	.	.	.	3*
Ra 9	Regards only momentarily	.	.	.	.	3*
CC1 6	Regards momentarily	.	.	.	.	2
P 7	Regards momentarily	.	.	.	.	16: 4
			.	.	.	20: 3
			.	.	.	2
			.	.	.	1

§ 3. REGARD — *Continued*

						CRITICAL AGE				
(b) TYPE— <i>Continued</i>										
<i>Regards prolongedly</i>										
RD 4	Regards prolongedly					2*	2	12 : 3	4	2
Cp 5	Regards prolongedly					—	1	16 : 3	2	1
P 9	Regards prolongedly (increasing)					1	1	20 : 2	2	1
P 9	Regards prolongedly (decreasing)					1	2	24 : 2	1	1
<i>Regards after delay</i>										
RD 1	Regards after delay					3*	3	12 3	2	1
Ra 3	Regards after delay					2*	3	12 3	2	1
P 4	Regards after delay (increasing)					1	1	20 : 2	2	1
P 4	Regards after delay (decreasing)					1	2	24 : 2	1	1
<i>Regards recurrently</i>										
Cp 3	Regards recurrently					—	2	16 : 3	2	1
CC1 7	Regards recurrently					—	2	16 : 3	2	2
P 8	Regards recurrently (increasing)					1	1	20 : 2	2	1
P 8	Regards recurrently (decreasing)					1	2	24 : 2	1	0
<i>Regards intermittently</i>										
CC1 8	Regards intermittently					1	1	20 2	1	0
<i>Shifts regard to surroundings</i>										
Rd 13	Shifts regard to surroundings					4*	3*	8 : 3	2	1
<i>Shifts regard to Examiner</i>										
RD 15	Shifts regard to Examiner (increasing)					—	2*	6 : 3	3*	3
RD 15	Shifts regard to Examiner (decreasing)					3*	3	12 : 3	2	2
CC 4	Shifts regard to Examiner					2	2	44 : 3	3	3
Cp-Sp 5	Shifts regard to Examiner					1	2	56 : 3	—	—
<i>Regards hand</i>										
CC1 15	Regards hand					—	—	12 : 3	3	2
P 16	Regards hand					—	2	16 : 3	1	1
<i>Shifts regard to hands</i>										
CC 5	Shifts regard to hand					—	2	16 : 3	2	1
(c) EXTENT										
Su 65	Fixates definitely					—	1*	6 : 3	+	+
Rd 17	Follows past midplane					—	2*	6 : 3	3*	3
RD 7	Regards in midplane					—	2*	6 : 3	3*	3
so 2	Visually pursues moving person					—	1*	6 : 3	3*	+
Ra 5	Regards in midplane (spontaneously or after shaken)					2*	2	12 : 3	4	+
RD 20	Follows approximately 180°					2*	2	12 : 3	3	+
CC1 3	Regards cube					—	2	16 : 4	4	4
Ra 8	Regards spontaneously in midplane					2	2	16 : 3	4	4
RD 2	Regards immediately					2	2	16 : 3	4	4
CC1 13	Regards predominantly					—	2	16 : 3	3	4
P 1	Regards (s.m p. or n m.p.)					—	2	16 : 3	4	4
P 2	Regards with definite fixation					1	2	20 : 4	4	4
Ra 15	Regards rattle in hand					2	2	20 : 4	4	4
Sp 6	Regards consistently					1	1	24 : 4	4	4
B 8	Regards consistently					—	2	24 : 4	4	4
Cp 7	Regards consistently					1	2	24 : 3	4	4
CM 11	Shifts regard from cube to cube					1	2	24 : 3	4	4
RD 5	Regards consistently					1	2	24 : 3	4	+
Ra 11	Regards consistently					1	2	24 : 3	4	+

§ 3. REGARD — *Continued*

		CRITICAL AGE				
(c) EXTENT — <i>Continued</i>						
CC1 12	Regards consistently	—	2	24 . 3	4	4
Ra 48	If drops, regards after losing	1	2	24 . 3	1	—
P 6	Regards immediately	1	2	24 . 3	3	4
P 10	Regards consistently	—	1	28 . 3	4	4
RD 11	Regards string	1	2	28 . 3	+	+
CM 12	Pursues visually to platform or floor	1	2	36 . 3	3	2
R-S 17	Regards ring as approaches and pulls string	1	2	36 . 3	4	4
P-Bo 21	Regards pellet after dropped from bottle	2	2	40 . 3	4	4
P-Bo 2	Regards pellet as dropped in bottle	2	2	40 . 4	4	4
B 59	Regards clapper	2	1	40 . 3	3	4
P-Bo 2	Regards pellet in bottle	2	2	44 : 3	3	4
P-Bo 20	Perceives disappearing of pellet from bottle	2	2	48 . 3	3	4
CpC 4	Attends simultaneously to cup and cubes	2	2	48 . 3	3	4
P-Bo 4	Attends predominantly to pellet	1	2	48 . 3	4	4

§ 4. PREHENSION

		CRITICAL AGE				
(a) APPROACH AND HANDEDNESS						
<i>Response to contact</i>		—	—	4 . 3	3*	4*
Ra 18	(Contact) hand opens	—	3*	6 . 3	2*	2
Ra 16	(Contact) hand clenches	—	3*	8 : 3	2	1
Ra 17	(Contact) arm becomes active	3*	3*	8 : 3	2	1
Ra 19	(Contact) hand opens immediately	2*	2*	8 . 3	4	4
<i>Approach</i>		—	2	16 : 3	+	+
Cp 15	Approaches (n m p)	—	1	16 : 3	4	+
RD 23	Approaches	1	1	20 : 4	+	+
Ra 24	Approaches	1	2	20 : 3	4	+
Cp 16	Approaches	1	2	20 : 3	4	+
CC1 21	Directs approach	1	2	20 : 3	4	+
Sp 11	Approaches	—	2	20 : 3	4	+
B 17	Approaches bell	—	1	20 : 3	4	+
CC2 5	Directs approach to second cube	1	2	24 : 4	+	+
P 18	Approaches	1	2	24 : 4	+	+
CM 2	Reaches for screen	—	1	24 : 3	3	3
CC 37	Directs approach to third cube	2	2	28 : 4	+	+
Cp 21	Approaches handle first	2	2	28 : 3	3	+
<i>Prompt approach</i>		—	2	16 : 3	+	+
Cp 17	Approaches promptly (n m p)	—	2	20 : 3	4	+
RD 25	Approaches promptly	—	2	24 : 4	+	+
Cp 18	Approaches promptly	1	2	24 : 4	+	+
Sp 16	Approaches promptly	1	2	24 : 4	+	+
Ra 26	Approaches promptly	—	2	24 : 3	4	+
B 19	Approaches promptly	—	2	24 : 4	+	+
P 19	Approaches promptly	1	2	28 : 3	+	+
<i>Manner of approach</i>		1	2	20 : 3	3	1
RD 30	Arms flexed					

§ 4. PREHENSION — *Continued*

					CRITICAL AGE
(a) APPROACH AND HANDEDNESS — <i>Continued</i>					
Both hands					
RD 29	Approaches with both hands	—	—	16 : 3	4 4
Ra 27	Approaches with both hands	1	2	20 : 3	3 3
Cp 20	Approaches with both hands	2	2	28 : 3	3 3
One hand					
B 21	Approaches with one hand	2	2	24 : 3	3 3
P 20	Approaches with one hand	1	1	24 : 3	3 4
Ra 23	Approaches with one hand	2	2	28 : 3	+ +
RD 28	Approaches with one hand	1	2	28 : 3	+ +
CC 8	Approaches with one hand	2	2	32 : 3	4 4
Right hand					
Sp 12	Approaches with right hand	1	1	24 : 3	2 2
B 31	Grasps with right hand only	2	2	32 : 3	3 3
B 22	Approaches with right hand	2	2	36 : 3	2 3
CC 18	Grasps cube in right hand	2	2	44 : 3	3 3
P	Approaches with right hand	2	2	44 : 3	3 3
Miscellaneous					
Ra 49	If drops, strains toward lost rattle	1	2	24 : 3	+ +
CC 11	Reaches for cube beyond reach	—	2	28 : 3	2 2
CM 17	Reaches for cube out of reach	—	1	28 : 2	2 2
B 25	Inverts hand on approach	—	1	28 : 3	3 3
P 22	Approaches with index finger extended	2	2	40 : 3	2 1
CC 10	Approaches cube on T.T. with cube in hand on pres	2	2	40 : 3	3 3
(b) GRASP					
Ra 16	(Contact) hand clenches	—	3*	6 : 3	2* 2
Ra 21	(In hand) holds actively	—	2*	6 : 3	3* 4
Ra 18	(Contact) hand opens	2*	2*	8 : 3	4 4
per 4	Pulls at dress	1*	1	12 : 3	3 —
CC1 26	(In hand) holds actively	—	—	16 : 3	3 4
Ra 20	Near hand grasps rattle	1	2	20 : 3	4 4
F 19	Holds block actively	—	1	24 : 3	4 4
F 37	Attempts secural of block	—	2	24 : 3	3 4
F 44	Removes block from hole	1	2	32 : 3	3 4
F 45	Removes block immediately	2	2	52 : 3	4 +
Grasps					
RD 34	Grasps ring	1	1	20 : 3	4 +
CC 14	Grasps cube	1	2	24 : 4	4 4
B 28	Grasps bell	—	2	24 : 4	4 4
CM 19	Grasps a cube	1	2	24 : 4	4 4
Ra 32	Grasps rattle	—	2	24 : 3	4 4
CC1 25	Grasps cube	1	2	24 : 4	4 4
Sp 19	Grasps spoon	1	2	24 : 4	4 4
CC2 11	Grasps second cube	—	2	24 : 3	4 4
B 30	Grasps promptly	—	2	24 : 3	4 4
Cp 26	Grasps cup	—	1	24 : 3	4 4
P 37	Grasps pellet	—	2	32 : 3	3 4
R-S 11	Grasps string	—	1	32 : 3	4 4
CC3 9	Grasps third cube	2	2	36 : 3	3 3
F 50	Grasps block after removal	1	2	36 : 3	4 4
CM 3	Grasps screen	2	2	40 : 3	2 2
P 38	Grasps promptly	2	2	48 : 3	3 4
F 49	Picks out or grasps block	1	2	56 : 3	+ +
Dislodges on contact					
Cp 25	Dislodges on contact	—	2	16 : 3	3 3
CM 18	Dislodges on contact	—	2	20 : 4	3 2

§ 4. PREHENSION — *Continued*

§ 4. PREHENSION — *Continued*

							CRITICAL AGE	
(c) RETENTION AND RELEASE — <i>Continued</i>								
CM 29	Holds two cubes	.	.	.	2	2	32 : 3	3
Cp-Sp 32	Retains one, secures other	.	.	.	—	2	36 : 3	4
Cp-C 32	Holds two cubes, one in each hand	.	.	.	2	2	40 : 3	3
CM 21	Holds one cube and grasps another	.	.	.	2	2	40 : 3	3
P 54	Retains pellet	.	.	.	2	2	44 : 3	3
CM 26	Holds one cube, grasps one cube after another	.	.	.	2	2	56 : 3	+
<i>Transfers</i>								
RD 42	Transfers ring	.	.	.	1	2	28 : 3	+
Sp 34	Transfers spoon	.	.	.	1	2	28 : 3	3
CC 31	Transfers cube	.	.	.	1	1	28 : 3	4
CC1 33	Transfers cube	.	.	.	1	1	28 : 3	3
B 53	Transfers bell	.	.	.	1	1	28 : 3	3
Ra 44	Transfers rattle	.	.	.	2	2	28 : 3	+
B 43	Transfers frequently	.	.	.	2	2	40 : 3	2
CC2 16	Transfers a cube	.	.	.	2	2	44 : 3	2
<i>Releases</i>								
F 56	Releases block on formboard or table top	.	.	.	2	2	40 : 3	3
G 4	Releases object	.	.	.	—	2	44 : 3	4
Cp-C 17	Casts cube	.	.	.	1	1	48 : 2	2
Ba 8	Throws or rolls ball	.	.	.	1	2	48 : 3	3
Ba 9	Throws or rolls ball to Examiner	.	.	.	1	2	48 : 3	3
F 26	Releases block on formboard	.	.	.	2	2	48 : 3	3
F 57	Releases block on formboard after demonstration	.	.	.	2	2	48 : 3	3
G 5	Releases object in Examiner's hand	.	.	.	1	2	52 : 3	2
PFB 28	Brings rod to box and releases	.	.	.	2	2	52 : 3	+
Cp-C 41	Releases cube in cup	.	.	.	1	2	52 : 3	3
Ba 10	Throws ball	.	.	.	1	2	52 : 3	3
F 13	Releases formboard	.	.	.	2	1	56 : 4	—
PFB 36	Releases rod in hole	.	.	.	1	2	56 : 3	+
Ba 10	Definite repetitive ball play	.	.	.	1	2	56 : 3	+
P-Bo 30	Releases pellet over bottle	.	.	.	2	2	56 : 3	++
Cp-C 43	Releases more than one cube in cup	.	.	.	1	2	56 : 3	++

§ 5. MANIPULATION

							CRITICAL AGE	
<i>Brings to mouth</i>								
Ra 30	Hands to mouth	.	.	.	—	1	16 : 2	1
Ra 38	Brings rattle to mouth	.	.	.	2	2	16 : 3	3
RD 40	Brings ring to mouth	.	.	.	—	2	20 : 3	4
CC 27	Cube to mouth	.	.	.	1	2	24 : 3	4
B 51	Brings bell to mouth	.	.	.	—	1	24 : 3	4
Sp 32	Brings spoon to mouth	.	.	.	—	1	24 : 3	4
Sp 30	Brings spoon first to mouth	.	.	.	—	2	24 : 3	1
F 21	Block to mouth immediately	.	.	.	—	1	24 : 3	2
F 20	Block to mouth	.	.	.	—	1	24 : 3	3
CC1 31	Brings cube to mouth	.	.	.	2	2	28 : 4	4
Cp 39	Brings cup to mouth	.	.	.	1	1	28 : 3	3
B 52	Mouths bell handle	.	.	.	1	2	28 : 3	2
CM 36	Brings cube to mouth	.	.	.	1	2	28 : 3	2
Su 38	Pulls foot to mouth	.	.	.	1	1	28 : 2	1

§ 5. MANIPULATION — *Continued*

					Critical Age
Cp-Sp 18	Brings spoon to mouth	—	—	32 : 3	2 2
R-S-B 17	Brings bell to mouth	—	—	32 : 3	2 1
R-S-B 16	Brings bell, ring, or string to mouth	—	—	32 : 3	2 1
R-S 25	Brings ring to mouth	—	2	32 : 3	2 2
Pe-Cr 5	Brings crayon to mouth	—	—	36 : 3	3 2
P-Bo 8	Brings bottle to mouth	3	3	40 : 3	2 2
CC2 14	Brings cube to mouth	3	3	40 : 3	2 1
CC3 16	Brings cube to mouth	2	2	40 : 3	1 2
Cp-Sp 17	Brings cup to mouth	2	2	40 : 3	3 1
Cp-Sp 16	Brings cup or spoon to mouth	3	3	44 : 3	2 2
P 47	Brings pellet to mouth	2	2	56 : 3	— —
<i>Manipulation on table top</i>					
CC1 27	Manipulates on table top	1	2	24 : 3	2 2
CC2 12	Manipulates cube on table top	1	2	24 : 3	3 2
P 35	Manipulates pellet on table top	1	2	28 : 3	2 3
CC3 11	Manipulates cube on table top	2	2	28 : 3	3 3
<i>Lifts</i>					
CM 35	Lifts a cube	—	2	24 : 3	4 4
Sp 31	Lifts from table top	1	2	24 : 4	4 4
B 48	Lifts bell	—	2	24 : 4	4 4
Cp 37	Lifts cup	1	2	28 : 4	4 4
F 9	Lifts formboard	1	2	32 : 3	3 3
Cp-C 23	Lifts cup	1	2	40 : 3	3 3
Cp-C 49	Lifts cup containing cubes	1	2	56 : 3	— —
<i>Hits or bangs</i>					
CC 26	Bangs cube on table top	1	2	28 : 3	2 3
B 50	Bangs on table top	1	1	28 : 2	2 2
Cp-Sp 12	Bangs cup or spoon on table top	—	2	36 : 3	3 3
CC 49	Hits cube on table top with cube in hand	—	1	36 : 2	2 2
Cp-Sp 13	Hits or bangs cup on table top	1	2	40 : 3	2 2
F 30	Hits block on formboard	1	1	44 : 2	1 1
Cp-Sp 12	Bangs cup or spoon on table top	3	3	48 : 3	2 1
B 50	Bangs on table top	2	2	52 : 2	1 —
Pa-Cr 8	Hits crayon on paper	2	1	52 : 2	2 —
<i>Platform reference</i>					
F 11	Brings formboard to platform	1	1	40 : 2	1 1
R-S 28	Brings ring to platform	1	1	40 : 2	2 2
Cp-C 21	Casts or brings cube to platform	1	1	44 : 2	2 2
Cp-C 28	Brings cup to platform	1	1	48 : 2	2 2
CC 43	Brings cube to platform	2	2	52 : 3	3 +
R-S 28	Brings ring to platform	2	2	56 : 3	+ +
<i>Combines</i> (See exploitation and adaptation for elaboration of combining)					
CC 46	Combines two cubes	1	2	36 : 3	4 4
F 29	Brings block to formboard	2	2	40 : 3	3 4
Cp-C 34	Combines cube and cube	1	1	40 : 2	2 1
CM 51	Combines cup and cube	2	2	44 : 3	2 3
Cp-C 35	Combines cup and cube	2	2	48 : 3	3 3
Pa-Cr 7	Combines paper and crayon spontaneously	2	2	52 : 3	3 +
R-S-B 21	Combines ring and bell	2	2	56 : 3	+ +
P-Bo 25	Combines pellet and bottle	2	2	56 : 3	+ +
<i>Pokes</i>					
P 36	Pokes pellet	1	1	40 : 2	1 1
B 60	Pokes clapper	1	2	44 : 3	3 3
PfB 8	Pokes in holes	2	2	48 : 3	3 2
P-Bo 14	Pokes at pellet	2	2	48 : 3	3 3

§ 6. ADAPTATION

				CRITICAL AGE		
<i>Differential behavior</i>						
so 2	Visually pursues moving person	.	.	—	1*	6 . 3
so 1	Responds to smiling and talking	.	.	—	1*	6 . 3
per 11	Anticipates feeding on sight of food	.	.	1	2	16 :
so 4	Sobers at strangers	.	.	1	2	16 : 3
so 5	Turns head on sound of voice	.	.	2	2	16 : 3
F 37	Attempts secural of block	.	.	—	2	24 : 3
Cp 21	Approaches handle first	.	.	2	2	28 : 3
F 44	Removes block from hole	.	.	1	2	32 : 3
R-S 23	Secures ring using string	.	.	2	2	36 : 4
R-S-B 5	Pulls ring or bell within reach	.	.	—	2	36 : 3
so 8	Adjusts to words	.	.	1	2	36 : 3
B 56	Waves	.	.	2	2	36 : 3
B 57	Rings	.	.	2	2	40 . 3
so 9	Responds to "bye-bye"	.	.	1	2	40 . 3
Cp-Sp 35	Brings spoon over cup	.	.	1	2	44 : 3
so 10	Adjusts to commands	.	.	1	2	44 : 3
G 4	Releases object	.	.	—	2	44 : 3
Cp-Sp 36	Places spoon in cup	.	.	1	1	44 : 3
PfB 6	Prior manipulation of holes	.	.	2	2	48 : 3
P-Bo 20	Perceives disappearance of pellet from bottle	.	.	2	2	48 : 3
R-S 32	Dangles ring by string	.	.	2	2	48 : 3
F 26	Releases block on formboard	.	.	2	2	48 : 3
R-S-B 19	Waves or rings bell	.	.	2	2	48 : 3
Ba 9	Throws or rolls bell to Examiner	.	.	1	2	48 : 3
PfB 17	Inserts rod in hole	.	.	—	1	48 : 3
Cp-C 39	Brings cube over cup	.	.	1	2	48 : 3
F 59	Brings block to formboard holes	.	.	1	2	48 : 3
so 11	Responds to inhibitory words	.	.	2	2	52 : 3
M 7	Approaches image socially	.	.	2	2	52 : 3
P-Bo 17	Apparently adapts manipulation so pellet drops out	.	.	2	2	52 : 3
Cp-C 40	Places one or more cubes in cup	.	.	1	2	52 : 3
Pa-Cr 9	Marks on paper with crayon	.	.	2	2	56 . 3
Pa-Cr 12	Makes linear marks	.	.	1	1	56 . 3
F 34	Incipient insertion of block	.	.	2	2	56 . 3
PfB 15	Brings rod to middle hole	.	.	1	2	56 . 3
C-S-B 1	Responds to "shoe"	.	.	1	2	56 . 3
Cp-C 48	Removes cube from cup	.	.	2	2	56 . 3
Cp-C 43	Releases more than one cube in cup	.	.	1	2	56 . 3
CC 50	Places cube in hand on cube on table	.	.	1	2	56 . 3
<i>Repeated behavior</i>						
CM 44	Drops one cube and grasps another	.	.	1	2	32 : 3
Cp-C 19	Drops cube, regrasps or grasps another	.	.	2	2	40 : 3
PfB 30	Brings rod to box on repeated demonstration	.	.	2	2	48 : 3
Pa-Cr 28	Marks on two or more sheets	.	.	2	2	52 . 3
Cp-C 20	Picks up one cube after another	.	.	2	2	52 . 3
Cp-C 18	Releases and resecures cube	.	.	2	2	52 . 3
Cp-C 42	Places two or more cubes in cup	.	.	1	2	56 . 3
Ba 11	Definite repetitive ball play	.	.	1	2	56 . 3
Pa-Cr 25	Combines paper and crayon repeatedly	.	.	1	2	56 . 3
CM 26	Holding one cube, grasps one cube after another	.	.	2	2	56 : 3
Cp-C 44	Places three or more cubes in cup	.	.	1	1	56 : 3
<i>Imitation</i>						
Cp-Sp 39	Combines cup and spoon only after demon	.	.	1	1	40 : 2
B 72	Waves or rings bell only after demon.	.	.	—	1	44 : 2
Pa-Cr 35	Adaptive response apparently increases	.	.	2	2	52 : 3
Cp-Sp 40	Combining improves after demonstration	.	.	2	2	52 : 3
PfB 41	Evidence of induced behavior	.	.	2	2	52 . 3

§ 6. ADAPTATION — *Continued*

							Critical Age
<i>Response to demonstration</i>							
B 70	Waves bell	—	2	32	3	2	4
Pa-Cr 21	Manipulates paper	—	2	40	3	2	1
B 71	Rings bell	2	2	40	3	2	3
Cp-Sp 38	Combines cup and spoon	2	2	40	3	3	4
Pa-Cr 27	Marks on one or more sheets	1	2	44	3	3	3
Ct 1	Approaches cube on table top with cube in hand	2	2	48	4	4	4
PfB 33	Inserts rod in hole	—	2	48	3	4	4
F 57	Releases block on formboard	2	2	48	3	3	2
PfB 28	Brings rod to box and releases	2	2	52	3	3	+
P-Bo 29	Holds pellet over bottle	1	2	52	3	3	+
PfB 40	Activity with middle hole	1	2	52	3	4	+
PfB 35	Inserts rod in middle hole	1	2	52	3	3	+
Pa-Cr 30	Draws crayon over paper	1	2	52	3	3	+
PfB 36	Releases rod in hole	1	2	56	3	+	+
PfB 38	Releases rod into box	1	2	56	3	+	+
Ct 3	Places cube on cube	2	2	56	4	+	+
Pa-Cr 34	Makes linear marks only	1	2	56	3	+	+
Cp-Sp 41	Hits or rattles spoon in cup	2	2	56	3	+	+
P-Bo 30	Releases pellet over top of bottle	2	2	56	3	+	+
PfB 37	Releases rod in middle hole	1	2	56	3	+	+
P-Bo 26	Brings pellet to bottle	1	2	56	3	+	+

§ 7. LANGUAGE AND SOCIAL BEHAVIOR

							Critical Age
(a) EXPRESSION							
v 5	No vocalizations heard	.	.	.	.	—	4 : 2
v 6	Vocalizes small throaty noises	.	.	.	.	—	4* : 3
v 1	Face brightens	.	.	.	.	—	6 : 3
v 7	Vocalizes ah-uh-eh	.	.	.	.	—	6 : 4
v 3	Smiles	.	.	.	.	—	6 : 3
v 8	Coos	.	.	.	.	1* : 2	12 : 4
v 9	Blows bubbles	.	.	.	.	1* : 2	12 : 4
v 10	Gurgles	.	.	.	.	1* : 2	16 : 3
v 4	Laughs	.	.	.	.	1 : 2	16 : 4
v 12	Vocalizes ma or mu	.	.	.	.	1 : 2	28 : 2
v 13	Two syl, 2nd rep first, ma-ma, da-da, etc.	.	.	.	.	1 : 2	32 : 3
v 11	Vocalizes da	.	.	.	.	1 : 1	32 : 3
M 2	Smiles	.	.	.	.	—	40 : 3
v 19	Says one "word" or more	.	.	.	.	1 : 2	44 : 3
Cp-Sp 46	Vocalizes	.	.	.	.	2 : 2	44 : 3
CC 59	Vocalizes	.	.	.	.	2 : 2	44 : 4
v 20	Says two "words" or more	.	.	.	.	2 : 2	52 : 3
so 13	Elicits attention	.	.	.	.	2 : 2	52 : 3
M 3	Vocalizes	.	.	.	.	2 : 2	52 : 3
M 7	Approaches image socially	.	.	.	.	2 : 2	52 : 3
v 21	Says three "words" or more	.	.	.	.	2 : 2	56 : 3
M 8	Brings face to mirror	.	.	.	.	1 : 2	56 : 3
B 64	Proffers bell to Examiner (or mother)	.	.	.	.	1 : 1	56 : 2
v 22	Says four "words" or more	.	.	.	.	1 : 2	56 : 2
CC 52	Offers cube to Examiner (or mother)	.	.	.	.	1 : 1	56 : 2

§ 7. LANGUAGE AND SOCIAL BEHAVIOR—*Continued*

							CRITICAL AGE	
(b) COMPREHENSION								
Br 1	Postural activity ceases	.	.	.	.	.	—	—
Su 64	Stares vacantly	.	.	.	.	.	—	—
Su 69	Facial expression attentive	.	.	.	.	.	1*	6:3
v 1	Face brightens	.	.	.	.	.	—	—
Br 2	Postural activity diminishes	.	.	.	.	.	3*	3*
so 5	Turns head on sound of voice	.	.	.	.	.	2	16:3
Br 5	Turns head	.	.	.	.	.	2	20:3
Br 6	Turns head to bell	.	.	.	.	.	2	24:4
so 8	Adjusts to words	.	.	.	.	.	1	2
so 9	Responds to "bye-bye"	.	.	.	.	.	—	2
so 10	Adjusts to commands	.	.	.	.	.	2	40:3
G 4	Releases object	.	.	.	.	.	—	3
G 6	Releases object in Examiner's hand	.	.	.	.	.	1	2
so 11	Responds to inhibitory words	.	.	.	.	.	2	44:3
C-S-B 1	Responds to "shoe"	.	.	.	.	.	1	2

CHAPTER X

ANTHROPOMETRIC NORMS

THE statistics of the following chapter are derived from the ten direct measurements and determinations described in Chapter VI. They are as follows:

DETERMINATION	SYMBOL DESIGNATION
1. Length from soles of feet to vertex (total length)	L
2. Length from soles of feet to suprasternal notch	B
3. Length from soles of feet to pubes	S
4. Biacromial diameter	D
5. Thorax diameter	E
6. Bicristal diameter	F
7. Head circumference	G
8. Thorax circumference	C
9. Weight	W
10. Number erupted teeth	

The subsequent tables (Tables 21, 22) list separately for the boys and girls the average, the standard deviation, and the range for each measurement of each age group. In addition there are included the norms for two derived measurements:

1. Head-neck length or L-B and
2. Body length or B-S.

In Tables 23, 24, the statistics for fifteen indices are given in terms of age and sex. These particular indices were selected as being indicative of body proportions. A detailed analysis of the physical measurements and a discussion of physical growth trends will be presented in another publication.

The regularity of the growth trends shown in Tables 21 and 22 is due to three factors: (1) a large proportion of the subjects measured at a given age were also measured at the previous age; (2) the group was homogeneous with respect to age, environment, and parental standard of child care and nationality of parents; and (3) the measurements were made with great care.

The normative use of the tables and the interpretation of deviations are briefly suggested in Chapter VI. However, it should be pointed out again

that the anthropometric averages here presented pertain only to the racial groups and to the socio-economic conditions specified in Chapter III. Although these averages do not in themselves characterize other groups, they may be used for comparative analysis and evaluation. It should also be emphasized that for valid comparison the measurement procedure specified in Chapter VI should be followed in detail. The tables present the measurements in centimeters and kilograms.

The fifteen indices above mentioned are designated symbolically in the tables in the following manner and order:

W/L	Weight ÷ total length
W/L ²	Weight ÷ total length squared
W/L ³	Weight ÷ total length cubed
B-S/L	Body length ÷ total length
S/L	Lower limb length ÷ total length
L-B/L	Head-neck length ÷ total length
D/L	Biacromial diameter ÷ total length
G/L	Head circumference ÷ total length
C/L	Thorax circumference ÷ total length
E/B-S	Thorax diameter ÷ body length
D/B-S	Biacromial diameter ÷ body length
D/E	Biacromial diameter ÷ thorax diameter
D/F	Biacromial diameter ÷ bicristal diameter
G/C	Head circumference ÷ thorax circumference
G/L-B	Head circumference ÷ head-neck length

TABLE 21
ANTHROPOMETRIC NORMS — BOYS

	AGE IN WEEKS												
	8	12	16	20	24	28	32	36	40	44	48	52	56
No. Cases	14	12	25	17	16	15	16	20	17	18	19	15	
Vertex: (cm.)													
Average	58.14	61.34	63.48	65.05	67.37	67.53	69.51	70.54	71.92	73.05	74.47	75.79	
Standard Deviation	1.89	2.11	1.60	1.76	1.05	1.34	1.42	1.54	1.83	2.19	2.48	2.00	
Maximum	61.55	64.55	67.40	68.25	71.20	69.60	71.30	72.90	77.10	79.90	79.60	81.00	
Minimum	55.20	58.25	61.30	59.80	64.90	66.80	67.70	69.00	69.50	70.50	72.50	73.90	
Suprasternal Notch:													
Average	42.75	45.28	47.01	48.11	49.95	50.27	51.59	52.35	53.33	54.40	55.83	56.86	
Standard Deviation	1.56	1.80	1.44	1.97	1.26	1.22	1.27	1.29	1.51	1.87	1.83	1.87	
Maximum	45.50	48.00	50.90	51.20	52.40	53.30	54.60	57.20	58.95	59.40	61.00	63.80	
Minimum	40.40	42.50	44.35	41.60	48.00	47.90	49.50	50.20	50.50	51.20	52.70	53.40	
Pubes:													
Average	22.70	24.07	25.11	25.89	27.14	27.15	28.33	29.05	29.55	30.41	31.23	31.97	
Standard Deviation	1.18	1.39	.93	1.18	1.32	.85	.85	1.17	1.27	1.55	1.35	1.48	
Maximum	25.60	26.80	27.60	28.50	28.75	29.80	29.70	31.10	33.70	33.75	35.00	35.60	
Minimum	21.35	21.45	23.90	23.60	25.70	26.20	26.80	27.90	27.90	28.50	28.80	30.00	
Bucromial:													
Average	13.03	13.56	14.39	14.88	15.30	15.78	15.95	16.15	16.35	16.92	17.26	17.36	
Standard Deviation	.72	.92	.75	.71	.49	.65	.64	.44	.77	.64	.75	.90	
Maximum	14.60	15.00	15.80	15.80	16.80	17.20	17.50	17.40	17.80	18.20	18.50	19.70	
Minimum	11.80	11.60	13.20	13.20	14.60	14.40	14.80	14.70	14.50	15.70	15.40	17.20	
Thorax (at nipples):													
Average	11.61	12.28	12.34	12.58	12.77	13.29	13.69	13.80	13.92	14.36	14.71	14.61	
Standard Deviation	.42	.65	.76	.51	.62	.81	.91	.81	.80	.65	.82	1.00	
Maximum	12.25	13.20	13.70	13.60	13.90	14.40	15.40	15.40	15.50	16.30	16.70	16.90	
Minimum	10.60	11.20	11.10	12.00	11.50	11.70	12.30	12.70	12.50	13.50	13.60	12.30	
Bieristal:													
Average	9.73	10.59	10.68	11.02	11.45	11.53	11.66	11.70	11.95	12.17	12.37	12.39	
Standard Deviation	.41	.60	.51	.59	.62	.82	.67	.41	.52	.54	.57	.43	
Maximum	10.50	11.80	11.90	12.60	13.50	12.90	12.40	12.60	13.30	13.40	13.40	14.00	
Minimum	8.60	9.70	10.20	10.30	10.50	11.10	11.10	11.10	11.50	11.60	11.50	11.90	

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ANTHROPOMETRIC NORMS — BOYS

TABLE 22
ANTHROPOMETRIC NORMS—GRIFFITHS

	AGE IN WEEKS												
No Cases	8	12	16	20	24	28	32	36	40	44	48	52	56
<i>Vertex: (cm)</i>													
Average	56.75	59.08	61.47	63.44	65.02	66.55	68.34	69.01	70.94	71.74	72.72	73.65	75.78
Standard Deviation	2.37	2.49	2.15	2.09	2.04	1.93	2.23	1.93	2.08	2.08	2.17	2.56	
Maximum	60.75	62.80	65.50	68.00	69.20	70.00	71.80	72.20	75.00	76.30	77.60	78.60	80.20
Minimum	54.00	55.20	57.50	59.90	62.30	64.30	65.40	67.70	68.40	68.90	67.80	71.70	
<i>Supraorbital Notch</i>													
Average	41.60	43.68	45.76	47.12	48.32	49.43	50.93	51.40	53.11	53.48	54.36	55.18	56.95
Standard Deviation	1.55	2.02	1.67	1.65	1.71	1.75	1.88	1.72	1.76	1.80	1.75	1.73	2.04
Maximum	44.30	46.80	48.50	50.30	51.70	52.20	54.00	54.80	57.05	57.10	57.60	58.90	59.50
Minimum	39.00	39.65	41.70	44.20	45.60	46.40	47.30	48.60	50.20	50.50	51.15	50.80	53.60
<i>Pubes:</i>													
Average	22.19	23.52	24.85	25.43	26.64	27.48	28.13	28.53	29.40	30.02	30.57	31.12	32.33
Standard Deviation	1.23	1.19	1.11	1.18	1.33	1.41	1.74	1.77	1.78	1.33	1.64	1.52	1.54
Maximum	23.75	25.10	26.10	28.00	28.70	29.65	31.55	30.90	31.10	32.40	33.50	34.50	34.60
Minimum	20.00	22.00	22.50	23.80	24.60	25.60	25.80	23.20	26.55	27.50	28.40	27.60	30.30
<i>Bacromial</i>													
Average	12.59	12.95	13.79	14.47	15.04	15.06	15.60	15.76	16.24	16.55	16.86	16.92	17.63
Standard Deviation	.92	.67	.83	.98	.77	.81	.73	.90	.78	.90	.85	1.02	.93
Maximum	14.00	14.00	15.20	16.30	16.20	16.50	17.30	17.60	17.70	18.30	18.80	19.40	
Minimum	10.60	11.60	12.20	13.20	13.60	13.80	14.50	14.00	14.80	14.80	15.20	15.40	16.10
<i>Thorax (at nipples)</i>													
Average	11.07	11.73	12.27	11.97	12.54	12.96	13.25	13.59	13.99	14.32	14.18	14.29	14.83
Standard Deviation	.67	.78	.84	.74	.82	.75	.77	.74	.78	.89	1.06	.97	.82
Maximum	12.00	11.00	13.90	13.20	13.80	14.20	14.50	14.70	15.30	15.60	16.40	16.30	15.90
Minimum	.960	9.20	11.30	10.80	10.80	11.40	12.10	11.70	12.70	12.40	12.60	12.70	13.10
<i>Biceps:</i>													
Average	9.48	10.02	10.49	10.57	10.92	10.98	11.51	11.36	11.91	11.94	12.03	12.13	12.52
Standard Deviation	.59	.48	.58	.71	.48	.56	.53	.49	.32	.41	.63	.55	.55
Maximum	10.40	12.60	12.00	12.70	11.80	12.60	12.20	12.40	12.50	12.60	13.80	13.20	
Minimum	.860	9.20	8.80	9.20	9.80	10.60	10.20	10.60	10.60	10.30	11.20	10.80	11.80

ANTROPOMETRIC NORMS — GIRLS

	AGE IN WEEKS												
No. Cases	8	12	16	20	24	28	32	36	40	44	48	52	56
<i>Head (cm)</i>													
Average	33.05	39.08	40.55	41.17	41.92	42.44	43.24	43.43	44.03	44.49	44.59	44.97	45.75
Standard Deviation	9.98	1.06	1.06	1.06	1.10	0.92	1.13	1.24	1.22	1.17	1.09	1.08	1.46
Maximum	39.50	40.60	42.70	42.80	45.20	44.40	45.70	46.40	46.60	47.20	47.90	48.40	43.50
Minimum	36.50	37.25	38.30	39.90	41.00	41.60	41.70	42.30	42.90	42.90	43.30		
<i>Thorax (at nipples):</i>													
Average	36.50	37.71	40.48	41.36	42.43	43.75	44.07	44.34	45.21	45.50	46.22	46.24	47.51
Standard Deviation	1.69	1.27	1.48	1.90	1.59	1.62	1.85	1.61	1.86	2.25	1.63	1.64	2.20
Maximum	39.20	39.20	43.10	45.40	46.10	46.90	45.50	47.90	48.10	49.90	49.30	49.00	52.40
Minimum	32.40	35.00	37.60	39.50	41.10	42.80	42.00	41.60	41.50	42.30	43.20	44.40	
<i>Weight: (kg.)</i>													
Average	4.60	5.28	6.12	6.42	7.04	7.44	7.96	7.86	8.45	8.75	9.02	9.07	9.84
Standard Deviation	4.47	5.51	6.62	6.61	6.62	6.61	6.61	7.71	8.84	7.75	7.78	8.82	2.18
Maximum	5.40	6.10	7.18	7.53	8.19	8.39	9.06	9.24	10.19	10.20	10.64	10.38	10.97
Minimum	3.70	4.25	5.22	5.19	6.07	6.34	6.88	6.54	7.18	7.61	7.77	7.04	8.59
<i>Head-Neck Length: (cm)</i>													
Average	14.95	15.08	15.94	16.31	16.77	17.12	17.41	17.61	17.83	18.27	18.42	18.46	18.82
Standard Deviation	1.00	.74	.68	.68	.53	.49	.72	.67	.43	.53	.82	.81	.91
Maximum	16.45	16.00	17.20	17.80	17.95	18.20	18.90	18.80	18.50	19.20	20.00	20.20	20.70
Minimum	13.70	13.40	14.90	15.45	15.90	16.30	16.00	16.60	17.20	17.20	17.20	17.00	17.50
<i>Body Length</i>													
Average	19.41	20.22	21.03	21.69	21.77	22.01	22.80	22.86	23.71	23.45	23.75	24.10	24.47
Standard Deviation	9.98	1.20	1.11	1.88	1.80	1.97	1.57	1.08	1.16	1.86	1.90	1.82	1.96
Maximum	21.45	21.70	22.60	23.50	23.70	23.60	26.25	25.40	26.00	24.85	25.20	20.00	25.50
Minimum	17.40	17.20	18.35	20.40	20.00	19.70	19.15	21.50	21.90	22.20	21.20	15.00	22.80
<i>Dentition</i>													
Average no of teeth													
Maximum	.	.	.	2	1	3	6	8	15	21	33	43	55
Minimum	.	.	.	0	0	0	6	6	7	7	8	8	10

TABLE 23
INDICES — Boys

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	AGE IN WEEKS												
	8	12	16	20	24	28	32	36	40	44	48	52	56
W/L · 10 ⁻³													
Average	86.1	94.6	101.5	108.4	118.4	120.4	124.0	124.5	128.0	133.0	135.3	135.0	140.1
Standard Deviation	6.7	7.8	7.4	9.7	7.9	8.1	8.2	8.5	9.0	10.1	11.1	9.2	11.7
Maximum	95.7	105.4	113.8	124.0	135.9	135.6	135.1	140.3	150.2	151.7	158.9	153.9	157.1
Minimum	75.6	83.4	89.1	88.2	104.7	107.2	108.5	110.9	116.6	116.8	117.8	119.4	119.7
W/L ² · 10 ⁻⁵													
Average	148.2	154.3	159.9	166.4	175.8	178.3	178.6	178.6	178.1	182.2	181.8	178.3	179.0
Standard Deviation	11.9	12.0	10.2	12.3	9.8	11.4	12.4	13.5	12.6	14.7	14.7	12.7	13.1
Maximum	165.4	174.4	175.7	186.5	197.5	202.1	201.1	207.2	218.4	220.5	212.3	195.1	200.3
Minimum	124.7	134.1	140.8	146.5	158.6	159.9	153.4	155.2	162.4	160.2	160.8	156.1	156.0
W/L ³ · 10 ⁻⁷													
Average	255.4	251.9	252.6	255.8	260.3	264.2	257.2	251.9	247.9	249.9	244.5	235.7	239.2
Standard Deviation	24.0	19.5	15.7	16.7	13.3	16.1	20.3	22.1	20.0	23.9	23.5	19.7	19.9
Maximum	299.8	298.5	282.3	287.5	287.1	312.4	299.6	306.2	300.1	314.3	312.8	292.9	255.4
Minimum	205.8	215.8	223.7	223.7	236.9	238.7	216.8	217.3	223.7	215.9	213.3	204.2	200.3
B-S/L · 10 ⁻³													
Average	34.7	34.7	34.3	34.1	33.8	34.2	33.4	33.0	33.0	32.8	33.0	32.8	32.5
Standard Deviation	1.3	1.4	1.4	2.1	1.3	1.3	1.3	1.1	1.1	1.3	1.1	1.4	1.2
Maximum	37.9	37.3	36.2	36.9	36.3	36.2	34.8	34.9	34.6	34.9	34.6	35.9	35.1
Minimum	32.6	32.5	31.5	30.1	31.0	31.9	32.8	31.4	30.4	30.4	30.6	30.4	30.5
S/L · 10 ⁻³													
Average	390.3	392.6	395.9	398.3	403.0	402.2	407.5	411.8	411.1	416.2	419.3	421.6	425.6
Standard Deviation	13.5	12.9	9.9	10.7	15.0	9.9	8.5	10.3	8.8	12.6	10.5	11.5	11.4
Maximum	424.5	416.1	420.7	417.5	429.8	420.1	418.9	428.3	437.0	445.8	439.6	439.5	447.4
Minimum	368.6	368.2	381.1	381.8	375.7	388.7	385.8	390.1	400.2	398.8	398.0	396.6	403.2
L-B/L · 10 ⁻³													
Average	262.3	259.8	259.8	260.6	258.2	255.5	257.8	257.8	258.5	255.3	250.2	249.8	249.3
Standard Deviation	9.8	8.3	10.7	4.3	5.9	7.2	7.0	4.6	6.3	7.5	7.1	9.6	6.4
Maximum	282.2	270.3	281.1	304.3	265.4	269.8	268.0	264.1	274.0	268.2	263.9	264.3	259.3
Minimum	249.5	238.0	244.8	239.0	245.4	245.9	245.0	248.6	246.5	241.5	236.1	223.1	236.8
D/L · 10 ⁻³													
Average	224.2	221.6	225.2	229.0	227.3	233.3	229.0	229.8	227.1	231.8	231.9	229.1	231.7
Standard Deviation	11.2	13.5	10.4	8.8	8.8	9.9	9.8	8.5	8.5	9.3	11.8	6.7	6.7
Maximum	243.0	241.1	251.1	241.2	250.3	245.3	248.1	244.9	250.3	251.0	246.8	243.5	243.5
Minimum	205.5	189.3	210.1	212.5	219.5	215.2	209.1	208.7	218.1	217.2	203.7	217.3	217.3

INDICES—Boys

AGE IN WEEKS

	8	12	16	20	24	28	32	36	40	44	48	52	56
G/L · 10 ⁻³													
Average	671.2	659.7	655.0	652.8	646.3	654.4	649.9	645.6	640.9	635.5	632.4	624.4	604.8
Standard Deviation	15.6	16.9	18.3	15.4	18.4	17.1	20.9	22.5	22.6	23.9	24.8	19.1	18.2
Maximum	702.8	690.1	684.3	675.0	681.4	693.9	688.6	688.3	684.0	687.7	683.6	666.6	633.7
Minimum	646.8	626.9	607.0	620.2	613.2	621.9	601.9	600.5	600.7	591.6	591.1	579.4	
C/L · 10 ⁻³													
Average	646.5	641.4	643.5	652.4	657.5	660.9	651.7	637.0	642.2	639.4	636.7	628.3	620.6
Standard Deviation	25.7	25.5	24.3	24.5	20.3	32.9	34.1	35.4	31.9	23.2	31.8	27.7	17.7
Maximum	689.4	700.4	707.4	693.1	694.9	734.2	741.0	729.6	742.0	678.1	734.7	704.8	647.1
Minimum	582.5	597.5	607.3	603.4	612.1	607.5	587.4	600.5	596.6	599.7	592.9	593.4	588.2
E/B-S · 10 ⁻²													
Average	48.5	49.7	48.8	49.8	50.0	50.2	50.5	50.5	50.8	50.3	49.9	50.9	
Standard Deviation	3.2	3.3	3.7	3.4	3.8	3.4	2.3	3.3	2.9	3.4	2.1	2.1	
Maximum	54.7	57.3	58.0	58.3	56.4	60.6	56.5	54.8	59.6	56.9	58.6	55.8	
Minimum	43.2	44.6	42.4	43.5	44.7	44.7	46.3	45.7	45.2	46.2	46.5	44.6	47.5
D/B-S													
Average	648.6	639.3	657.0	675.2	674.6	684.3	683.1	697.1	687.4	706.9	702.2	699.9	714.6
Standard Deviation	45.4	49.6	41.5	36.8	30.1	36.1	32.1	34.7	29.3	39.0	28.6	38.8	30.3
Maximum	743.0	705.8	746.4	733.3	739.4	750.5	736.3	770.9	747.7	780.2	758.0	784.3	756.2
Minimum	584.4	529.6	586.6	607.1	621.9	620.1	629.7	647.5	625.5	653.2	660.3	633.7	656.5
D/F · 10 ⁻²													
Average	133.5	128.3	134.4	134.6	136.8	136.2	137.3	136.8	139.2	139.7	140.1	140.2	
Standard Deviation	5.7	7.6	6.5	6.7	7.1	4.7	6.2	5.4	5.8	8.4	4.8		
Maximum	146.0	147.4	146.9	148.0	146.6	150.9	149.5	145.6	147.3	147.5	150.0	152.5	147.9
Minimum	119.9	111.8	115.5	125.7	120.4	123.7	119.8	127.8	123.8	130.8	126.2	119.3	129.3
D/F													
Average	112.5	110.9	116.6	120.4	120.9	116.8	115.9	116.4	117.8	117.7	118.0	118.6	114.9
Standard Deviation	5.5	4.5	7.9	4.9	6.0	6.6	5.3	5.0	5.9	3.3	5.5	7.6	3.5
Maximum	121.6	117.8	133.3	127.6	132.1	131.2	126.6	129.1	131.0	123.0	127.4	139.0	118.1
Minimum	98.3	103.0	101.4	111.3	110.8	109.0	105.1	109.0	109.0	112.3	109.9	109.2	104.9
G/C · 10 ⁻²													
Average	103.7	103.1	101.6	100.0	98.5	99.6	99.9	101.2	99.9	99.3	99.4	99.6	97.3
Standard Deviation	11.0	3.4	4.4	4.5	4.6	5.5	5.9	4.9	4.8	3.4	3.4	3.3	
Maximum	111.0	111.7	110.7	110.6	108.4	108.4	111.0	109.1	110.3	105.3	107.3	105.1	
Minimum	96.0	98.5	91.2	91.8	93.0	92.1	92.9	94.3	92.0	92.3	93.0	94.2	93.6
G/I-B · 10 ⁻²													
Average	256.7	253.9	252.4	251.1	250.4	256.1	252.1	249.7	248.0	248.9	252.9	250.1	242.7
Standard Deviation	10.7	5.8	11.3	13.0	8.8	7.2	4.6	4.3	4.8	8.6	8.7	9.1	7.5
Maximum	270.7	263.3	282.3	264.8	268.8	268.9	266.2	264.0	261.2	281.8	270.8	256.8	
Minimum	238.7	242.7	223.6	212.6	235.5	244.0	236.5	233.6	232.6	226.9	228.2	231.6	228.5

TABLE 24
INDICES — GIRLS

188 THE PSYCHOLOGY OF EARLY GROWTH

	AGE IN WEEKS												
	8	12	16	20	24	28	32	36	40	44	48	52	56
$W/L \cdot 10^{-4}$													
Average	80.8	89.3	98.5	101.1	108.1	111.7	116.4	113.8	119.1	121.9	124.1	123.1	129.9
Standard Deviation	6.3	6.3	7.3	7.9	8.2	8.3	7.3	9.0	10.1	9.3	9.7	8.5	8.5
Maximum	91.5	99.7	111.8	114.3	128.5	124.9	127.7	131.7	138.6	137.2	139.6	139.0	141.4
Minimum	68.4	77.0	84.6	84.9	96.0	96.0	102.8	98.6	101.4	106.0	105.9	103.8	112.7
$W/L^2 \cdot 10^{-5}$													
Average	143.7	151.1	160.3	159.4	166.5	167.9	170.5	166.4	167.9	170.1	170.8	168.0	171.7
Standard Deviation	8.7	9.4	9.6	11.4	13.3	12.5	11.0	12.0	14.4	12.9	16.3	13.4	13.1
Maximum	155.1	167.0	178.0	182.7	201.8	189.8	193.0	195.9	194.9	193.6	192.5	190.2	197.2
Minimum	126.4	139.4	137.1	134.4	146.6	145.5	151.9	142.9	143.2	148.5	144.2	147.1	148.0
$W/L^3 \cdot 10^{-7}$													
Average	254.9	256.5	261.1	251.6	256.3	250.4	249.8	239.3	237.0	237.3	234.8	227.2	227.0
Standard Deviation	19.9	19.8	16.7	19.5	24.2	22.2	20.5	22.2	20.1	23.4	19.3	22.4	22.4
Maximum	281.4	288.0	293.0	292.0	316.9	288.7	291.7	291.3	283.8	276.7	279.4	264.4	275.1
Minimum	218.6	222.1	222.4	212.7	223.9	219.8	222.4	207.1	202.3	208.0	196.5	198.2	194.4
$B-S/L \cdot 10^{-2}$													
Average	34.3	34.4	34.1	34.2	33.4	33.0	33.3	33.1	33.4	32.7	32.6	32.7	32.3
Standard Deviation	1.8	1.3	1.2	1.0	1.2	1.1	2.1	1.8	1.4	.9	1.2	1.2	1.1
Maximum	38.7	36.5	36.8	36.6	35.2	34.4	38.0	38.8	36.4	33.9	34.5	34.7	34.6
Minimum	32.1	31.1	31.9	32.3	30.9	29.9	27.9	31.2	30.8	31.1	29.9	30.4	30.8
$S/L \cdot 10^{-3}$													
Average	392.2	399.5	398.3	400.8	409.5	412.6	411.5	413.1	414.3	418.3	420.3	422.2	427.0
Standard Deviation	11.6	8.9	13.4	11.4	12.7	10.3	21.5	17.8	15.2	8.6	10.6	9.5	9.5
Maximum	403.8	410.7	427.2	423.6	442.7	433.1	460.5	436.5	440.2	438.4	436.0	438.9	445.2
Minimum	360.6	379.3	366.4	376.5	391.0	390.5	378.2	354.7	380.5	401.0	404.2	403.6	409.1
$L-B/L \cdot 10^{-3}$													
Average	264.2	256.7	259.2	257.1	257.6	257.4	254.8	255.3	251.4	254.7	252.8	250.7	248.7
Standard Deviation	9.6	10.2	6.5	7.3	5.8	7.9	8.2	8.8	6.6	6.6	9.1	7.1	8.8
Maximum	280.4	282.3	274.7	272.5	268.0	272.7	267.3	272.9	263.4	265.9	277.5	269.6	263.2
Minimum	250.4	242.7	247.5	244.4	248.8	246.9	240.5	239.7	238.7	246.6	237.1	237.4	233.7
$D/L \cdot 10^{-3}$													
Average	222.4	219.2	221.8	228.0	230.4	226.3	228.2	228.9	230.3	231.9	229.6	233.1	
Standard Deviation	11.8	6.6	11.9	13.3	10.3	8.3	7.4	8.8	10.1	10.0	9.4	9.4	
Maximum	237.6	227.2	251.2	253.7	252.7	239.7	242.2	243.8	243.2	244.2	248.3	245.5	
Minimum	195.5	205.0	202.3	210.8	213.5	209.7	215.4	210.3	210.2	209.3	210.5	211.3	217.3

INDICES — GIRLS

ANTHROPOMETRIC NORMS

AGES IN WEEKS													
	8	12	16	20	24	28	32	36	40	44	48	52	56
G/L 10^{-4}													
Average	673.3	664.3	657.3	649.3	645.2	638.1	633.3	629.6	621.0	620.3	613.5	610.8	596.2
Standard Deviation	24.3	25.4	25.5	20.5	25.9	21.3	22.6	20.7	21.9	15.5	17.4	16.9	31.4
Maximum	712.1	722.1	716.5	686.0	723.2	694.8	684.3	675.1	676.5	658.0	673.4	641.5	655.5
Minimum	630.4	627.3	604.0	604.4	609.5	582.5	602.8	588.1	585.8	583.2	577.3	573.8	526.8
C/I _L 10^{-4}													
Average	645.9	640.8	656.9	650.1	652.8	657.7	645.9	642.0	637.5	634.3	635.9	628.0	628.7
Standard Deviation	31.6	24.1	21.5	30.0	22.7	27.0	22.0	28.0	29.3	29.8	29.0	22.2	36.6
Maximum	694.3	681.9	699.1	699.5	683.4	703.9	693.6	712.2	698.7	692.8	709.7	675.8	730.8
Minimum	598.8	606.6	616.7	596.5	607.5	613.4	607.7	606.5	593.4	586.9	589.1	595.4	594.9
E/B-S 10^{-3}													
Average	48.9	49.8	50.0	48.7	50.2	50.1	50.7	49.8	49.5	50.9	51.1	50.3	51.2
Standard Deviation	2.1	1.8	3.3	3.2	3.4	2.9	4.6	3.3	3.5	2.3	2.2	2.7	1.9
Maximum	51.9	54.1	60.3	57.0	57.5	54.3	65.2	53.5	55.2	54.5	57.0	57.0	54.3
Minimum	45.4	46.6	45.1	43.1	42.8	44.3	42.6	40.1	45.0	45.6	47.9	45.1	48.8
D/B-S 10^{-3}													
Average	649.1	642.7	650.4	668.4	687.0	687.2	678.8	690.6	686.6	706.7	713.2	702.1	721.2
Standard Deviation	44.4	32.7	41.5	43.9	29.5	30.3	37.5	47.8	49.0	34.8	29.9	36.0	26.8
Maximum	716.4	715.2	768.8	747.7	740.0	733.3	768.9	782.2	735.6	766.5	759.4	760.2	779.1
Minimum	545.4	597.9	569.4	575.1	621.0	607.9	614.1	551.1	611.7	625.7	644.0	647.1	686.0
D/E • 10^{-4}													
Average	132.7	129.2	130.4	137.6	137.0	137.3	136.3	138.7	137.4	138.5	139.5	139.7	140.9
Standard Deviation	9.6	4.6	8.9	7.9	7.5	7.5	6.3	5.9	5.7	6.4	5.4	6.5	4.9
Maximum	142.6	137.7	148.3	157.9	154.3	153.7	149.1	147.9	149.2	145.4	148.7	151.6	147.0
Minimum	112.5	120.5	107.3	120.3	127.9	126.6	123.7	123.7	122.3	119.3	125.6	125.8	130.6
D/F 10^{-2}													
Average	113.8	110.7	112.6	119.7	118.5	116.5	117.6	114.8	117.6	119.2	119.2	118.9	
Standard Deviation	8.8	7.1	9.3	8.6	6.7	7.8	8.3	7.1	4.6	5.8	4.8	3.1	
Maximum	129.1	124.0	139.4	138.9	131.4	142.9	132.5	129.0	121.4	125.1	128.3	131.3	123.7
Minimum	100.9	100.8	94.9	104.5	106.0	106.7	107.4	102.8	106.7	108.3	108.5	110.2	113.4
G/C 10^{-2}													
Average	104.3	103.6	100.1	99.4	98.9	97.1	98.3	98.0	97.5	97.9	96.5	97.4	96.4
Standard Deviation	4.4	3.7	4.1	5.6	5.1	4.4	2.3	3.3	3.7	3.9	3.7	3.3	3.2
Maximum	112.4	111.1	109.5	113.5	114.4	104.8	104.6	104.4	104.1	108.9	108.9	105.7	100.4
Minimum	99.1	98.1	92.8	87.7	89.5	87.4	94.9	90.4	88.8	93.4	91.5	92.4	89.7
G/I-B 10^{-2}													
Average	255.1	259.5	253.9	253.4	249.9	247.9	248.7	246.8	247.0	243.6	242.0	244.3	244.3
Standard Deviation	13.8	9.8	11.4	9.3	9.7	6.4	9.7	10.5	8.5	9.1	8.2	9.7	12.5
Maximum	277.1	279.8	279.0	268.3	276.4	266.5	270.6	268.2	269.4	266.3	269.8	260.5	265.5
Minimum	232.8	246.2	232.2	230.8	230.0	239.6	229.1	231.5	233.0	228.4	221.3	227.2	219.3

PART THREE

ANALYTIC APPRAISAL OF GROWTH STATUS

CHAPTER XI

THE PRINCIPLES OF GENETIC ANALYSIS

ALL ordered analysis whether qualitative or quantitative is in essence a form of measurement, because measurement always is comparison. Consider how completely our language depends upon observation of measurements: When we say, "The sky is blue," we unconsciously measure by comparing the color sensation experienced when looking at the sky with that experienced when looking at a certain section of a color chart; when we say, "The child is hungry," we identify his behavior with that characteristic of an individual who is satisfied by eating. Words as well as numbers may involve measurement. Thus, as Weiss¹ points out, terminology may be appropriately considered a manifestation of measurement.

However, in a more limited scientific sense, measurement is the quantitative evaluation of a single defined attribute by comparison with a standard scale. A scale is a one dimensional magnitude calibrated according to our number system. To devise a scale one must discover a linear relationship between some trait of the attribute to be measured and some other measurable aspect of the attribute. If the zero of a scale is identified with complete absence of the attribute, and a one-to-one correspondence is established between the scale division and our number system, the measurements obtained by using the scale may be subjected to all of the various mathematical manipulations applicable to numbers. At this point a false sense of security is introduced by the precision of mathematics. The measurements, no matter how refined, are dependent for their meaning and exactitude on the accuracy and validity of the concepts for which they stand. Every statistic must be referred to and interpreted in terms of the assumptions involved in the measures themselves. Thus, until concepts can be clearly and explicitly defined, it is well to use the simplest and most easily understood measuring technique available.

Frequently there is an unfortunate tendency to judge the scientific value of scales by their degree of absoluteness and by the constancy and refinement of

¹ Weiss, A. P : "The Measurement of Infant Behavior." *Psychol. Rev.*, 1929, 36, 453-471.

their unit of measure, with too little regard for appropriateness. Just as it is unscientific to compute a quotient to five decimal places when the divisor is reliable to only one, so it is unscientific to refine scales which measure we know not what. The history of measurement shows clearly that progress is achieved only when the definition and elaboration of the standard is based on knowledge of that which is being measured.² The units of measurement for length, weight, and time have as their basis observations of phenomena which were disclosed by tools which were less exact but scientifically no less appropriate than the meter stick, the balance beam, and the chronograph. No scientist scorns the employment of ways of measurement however primitive when such specification yields knowledge of relationships hitherto not realized. Simple comparison, classification, and definition have played an important role in the advancement of science.

Mathematical techniques for dealing with values, not expressible in quantitative terms or perhaps not even seriated, are few and relatively undeveloped. It is true that to date those sciences which have made greatest progress are those which have most fully perfected their formulation of quantitatively expressible phenomena. But it does not follow that biological science will find its optimal progress in the same way. More probably, significant future advances in the field of genetic science will utilize concepts better suited to the peculiar nature of the processes of growth.³

It is important then to review the characteristics of growth in order to suggest an approach appropriate for its appraisal and analysis.

§ I. THE NATURE OF GROWTH

There has been considerable controversy about the use of the word *growth*. Some have maintained that its meaning should be restricted to changes in size, while others have employed it to denote all of the changes which an organism manifests in its progress with age. A discussion of the pros and cons is rather futile since usage will be, after all, the final arbiter. There is ample precedent for defining growth as the progress of an organism toward a mature state and it is in this sense that the term is used in this publication.

² Kelley, Truman: *Scientific Method* Columbus, Ohio: The Ohio State University Press, 1929. Pp. vii 195. (See pp. 84-113.)

³ Indeed Lewin has already formulated concretely the way in which the mathematical concepts of topology may be utilized in studying the problems of behavior: Lewin, Kurt: *Principles of Topological Psychology*, Transl. F. Heider, F. and Heider, G.: New York and London: McGraw-Hill Book Company, 1936. Pp. xv + 231.

The most obvious evidence of physical growth is that of quantitative increase of the total organism or some defined segment of it, and it is this aspect which can be most precisely measured. Accordingly, the literature is abundant with data on dimensional and ponderal growth changes. Mathematical functions expressive of the observed changes have been suggested, but as yet there is no agreement that any one mathematical function typifies the course of augmentation for physical growth. It is agreed, however, that from birth through the first few years growth is rapid. Following this is a period of slow constant growth and subsequently an adolescent spurt which diminishes after a few years when mature size and stature are reached. Thus physical growth is said to be rhythmic in character rather than constant.

The course of behavior growth has been less well charted. Lacking a measuring device such as the meter stick or the balance beam, behavior has been studied in relation to time, but without revealing a generally acknowledged behavior unit. Consequently the behavior of a certain stated percentage of the population at successive ages has been used as a standard. The variability of individuals in terms of arbitrary test scores (composed of items selected because they showed increasing frequency with age) is considered to be a proper base of reference for an individual's status, and the course of individual behavior growth has been plotted accordingly. It is obvious that by selecting for observation only those behaviors which increase with age, an incomplete study of behavior development is made. It is equally obvious that behavior measured in terms of age will show a linear relationship with age. As a recognition of this latter distortion, behavior age has frequently been transmuted into units theoretically appropriate to ponderal and dimensional growth. But behavior growth does not necessarily follow the same course as physical growth and such correlation of the two cannot be entirely justified.⁴

It would seem as though changes of variability with age⁵ might afford a relationship of great value for growth measurement; but is this relationship a true or a spurious one? Variability may be a function of the test items and of scoring procedure. It is quite possible to devise a test which, applied to a group of newborns and adults, would show the newborns to be the more variable. The method of absolute scaling which has been suggested is also limited

⁴This seems to us a limitation in Courtis' suggestion of transmuting behavior measurements into isochrone units which are based on the Gompertz curve of growth. Courtis, S A.: *The Measurements of Growth*. Ann Arbor, Mich : Brumfield and Brumfield, 1932. Pp. ii + 165

⁵Thurstone, L. L : "A Method of Scaling Psychological and Educational Tests." *Jour. Educ. Psychol.*, 1925, 15, 433-451. (See pp. 86-87.)

in that it necessarily includes only those items which increase in frequency with advancing age. This selective factor, as we pointed out above, surely oversimplifies the facts of growth.

To investigate decisively the relationship of variability to age necessitates a so-called absolute scale. Analyzing data from the Galton Laboratory, Ruger⁶ finds that the scedastic curves are of different types for different traits. For instance, variability in weight is least in childhood; whereas variability in perceptual judgment is greatest in childhood. It is obvious therefore that as yet our knowledge of behavior growth is inadequate for refined and precise measurement by statistical methods.

The most outstanding characteristic of behavior development is that it is intimately and coherently related to time and age. This point has been emphasized so fully in earlier publications⁷ that it hardly needs further discussion. Time is readily measurable. Even though the individual's chronological zero age cannot be precisely determined, a conventional or arbitrary zero furnishes a more tenable basis of reference than a less well-defined trait, such as variability.

The accompanying graph (Fig. 20) will enable us to consider in concrete terms some of the problems involved in the analysis and interpretation of behavior growth. This graph pictures the growth trends of several representative behavior characters displayed by a group of normative infants in the supine situation from 4 through 36 weeks of age. Ages are reckoned from birth, and the percentage of infants displaying a given behavior is shown at each age level. The percentage changes are properly expressive of the growth changes shown by the group as a whole. As Davenport⁸ has clearly pointed out, the curve of group statistics may express the variability of individuals in displaying a trait more than it does the true course of growth. Therefore, the following trends must be verified by studying the course of development in individuals. This has been done clinically and we may say that the percentages represent closely the frequency with which a child displays the various behaviors at the ages indicated. The examination procedure was not designed to determine successes and failures to preconceived ability tests, but was

⁶ Ruger, Henry A.: "On the Growth Curves of Certain Characteristics in Man (Males)." *Ann. of Eugenics*, 1927, 2 (Parts I and II), 76-100.

⁷ Gesell, A.: *Infancy and Human Growth*. Gesell, A., and Thompson, H., assisted by Amatruda, C S: *Infant Behavior: Its Genesis and Growth*.

⁸ Davenport, C. B.: "Critique of Curves of Growth and of Relative Growth." *Cold Spring Harbor Symposia on Quantitative Biology*, Volume 2. Cold Spring Harbor, Long Island, N Y : The Biological Laboratory, 1934. (See pp. 203-206.) Also *Proc. Am. Phil. Soc.*, 1931, 70, 381-389. (See p. 204.)

SUPINE SITUATION.
SAMPLE TRENDS OF BEHAVIOR

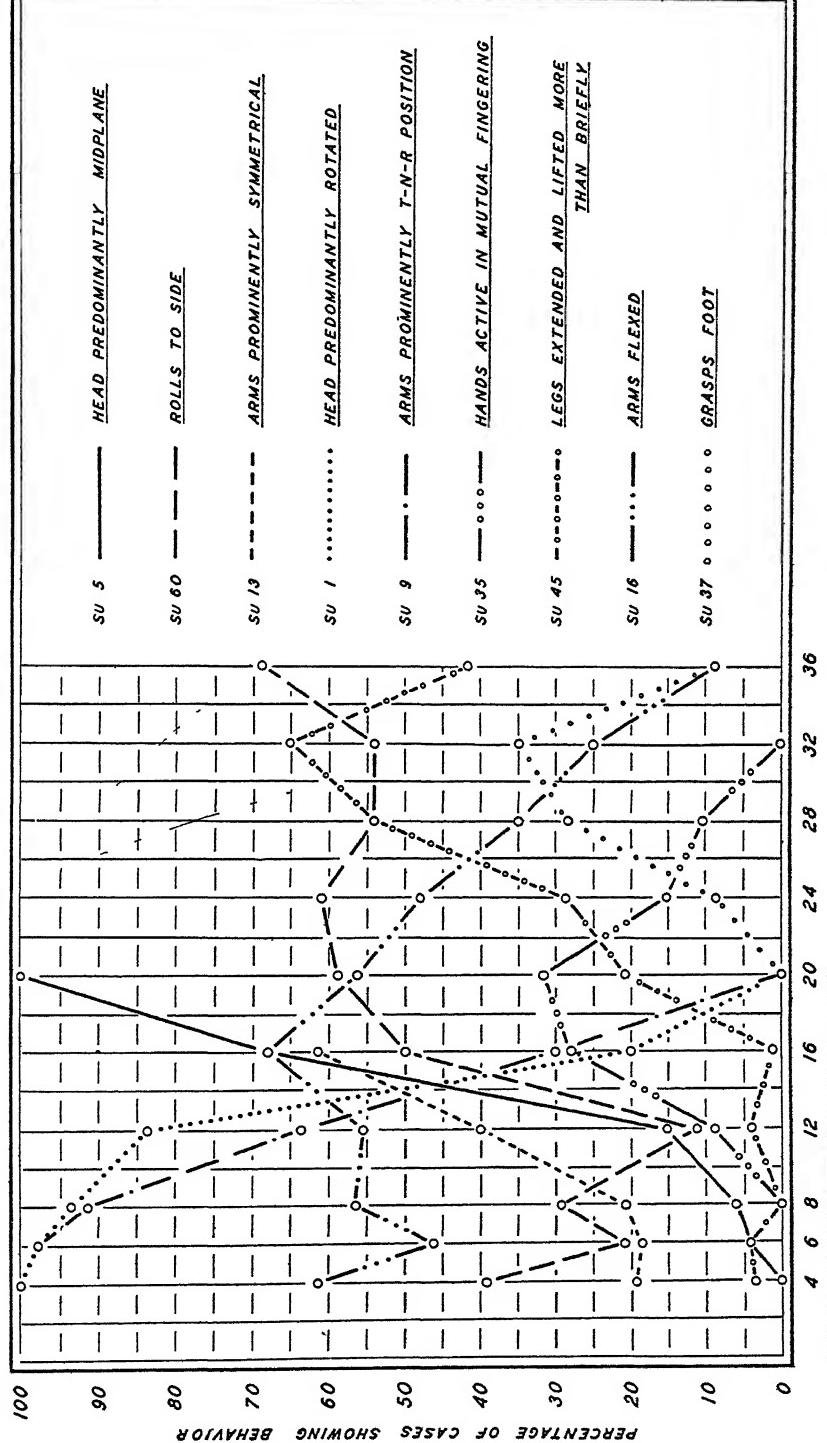


FIGURE 20

planned to elicit natural behavior at all the age levels. In the present illustrative instance, the infant was simply placed on his back and his spontaneous behavior was noted.

Consider the several behavior items which are indicated below in italics. It should be remembered that the graph purports to show what the normative infant actually does, not what he can do. It shows that *head predominantly in midplane* (Su 5) was not observed until 6 weeks, but thereafter was seen with increasing frequency; the curve for this behavior item rises sharply between 12 and 16 weeks until it indicates a frequency so common that the presence of the behavior in a given individual is to be taken for granted. On the other hand, at the early ages *the head is predominantly rotated* (Su 1) and this turned position of the head furnishes the stimulus for a tonic-neck-reflex (t.n.r.) posture. This t.n.r. posture and head rotation, although related, are not interdependent at all ages. The *prominent tonic-neck-reflex posture of the arms* (Su 9) is seen early with great frequency but it disappears by 20 weeks. This happens not because the head is no longer turned to the side, but because when the head is turned to the side, the infant either maintains a symmetric attitude of arms and legs or he *rolls to the side* (Su 60). Rolling to the side at 4 weeks is brought about by the rounded back of the infant, and also his frequent abrupt movements which bring the projection of his center of gravity beyond the small area of his contact with the supporting surface; the infant consequently rolls to the side. As his back becomes less rounded and his movements less abrupt, *rolling to the side* (Su 60) decreases. Later this item increases again but in a different pattern: The infant rolls to the side on swinging the legs and rotating the head. As the *head assumes the midposition* (Su 5), *the arms become prominently symmetrical* (Su 13), and as they extend somewhat at the elbows, the hands come together. *Mutual fingering* (Su 35) results; this activity drops out when, as the arms are further extended, the infant reaches down and *grasps his foot* (Su 37) which by *extending and lifting the leg* (Su 45) has been brought into his line of vision.⁹

The complexity of behavior growth is at once apparent when the trends of its component behavior items are studied in the foregoing manner. Moreover, one behavior pattern is seen to merge with the next in a surprisingly ordered way. Other investigations of the development of animals, as well as of

⁹ Adapted from Thompson, Helen: "The Measurement of Infant Behavior." *Journ. Exper. Educ.*, 1935, 3, 230-232.

humans, likewise suggest that behavior development is lawful. The relatively close agreement concerning the time of appearance of behavior traits among investigators as widely separated as California, Minnesota, and New Haven is ample proof that the stages of growth are ordered. It is therefore quite in accord with fact to hypothesize a normal sequence of behavior patterns through which a child of normal inheritance and in a given environment passes. The fact that no child is actually observed to follow exactly this course of development is explained by individual variations in growth potentialities, plus deviations in internal and external environment, plus the discontinuity of our observations.¹⁰ If the "normal" sequence of development is determined in relation to age, as we have done in this study, a normative schedule for measuring development is thereby established. This schedule has a sound basis and will not confuse us with numbers which might mislead because of their remoteness from the actual observations.

§ 2. BEHAVIOR PATTERN AND BEHAVIOR ITEM

It is important to consider just what is meant by the terms *behavior pattern* and *behavior item* before we may discuss them. A pattern of behavior is a configured response which can be described specifically in terms of a given situation. A pattern, as pattern, is not a circumscribed entity in nature. It always has a context which, if analyzed, can in turn be reduced to constituent patterns. But since this context also has contexts, it follows that the only pattern which has full integral status is the organismic pattern which is the individual himself. Pattern categories, therefore, can be arranged in a gradient from minute differentiated areas of behavior (like the reflex wink) to complex co-ordinations (like prehension) and to yet more inclusive patterns which correspond to the entire personality or large sectors of it. A *behavior item* differs from a behavior pattern in that the *item* designates some aspect of the behavior pattern. In the glossary, a behavior item is defined as "any specific more or less separate aspect of activity." While emphasizing specificity, this definition purposely permits wide latitude in its designation "more or less separate." The items are not pieces of behavior in the jigsaw puzzle sense;

¹⁰ A dissertation by Louise B. Ames, Yale Clinic of Child Development, entitled "Prone Progression in the Human Infant," indicates that there are fewer deviations from the normal sequence of development than has been supposed. An infant may pass through a stage of development very rapidly and therefore, unless a child is observed almost continuously, he may pass through that stage unnoticed by the investigator. *Genet. Psychol. Monog.*, 1937, 19, 409-460.

rather, they are natural aspects of behavior patterns which are sufficiently distinguishable to be useful in describing a total pattern. Certain constellations of behavior items therefore are characteristic of certain degrees of maturity. Thus the development of behavior patterns may be studied in terms of the statistical trends of individual behavior items.

§ 3. GROWTH TRENDS OF BEHAVIOR ITEMS

Returning to a consideration of Figure 20, it is seen that the behavior items follow diverse trends with age. These trends are for convenience designated as follows:

An item of behavior is said to show a *decreasing trend* if, at ascending age levels, there is a progressive decrease in the percentage of infants showing that behavior.

An item is said to show a *focal trend* if, at consecutive age levels, there is an increase, followed by a decrease in the percentage showing that behavior. The age or age range showing the highest percentage value is the *focus* of the item.

An item is said to show a *fluctuating trend* if, during the age range studied, there is more than one focus.

An item is said to show an *increasing trend* if, at ascending age levels, there is a progressive increase in the percentage showing that behavior.

An item is said to show a *constant trend* if there is no significant change from age to age in the percentage showing the behavior.

An item is said to show a *partially decreasing trend* if there is a constant trend of less than 75 per cent followed by a decreasing trend.

An item is said to show a *partially increasing trend* if there is an initial tendency for the item to increase and then to remain at a level of less than 75 per cent.

In specifying the trend of an item, it is necessary to define the age range under consideration. In terms of the total life span, all items are focal or fluctuating. Practically, however, we are usually concerned not with the total life cycle, but with merely a small segment of it.

In general, a *decreasing* and a *partially decreasing trend* represent obsolescing behavior which has diminishing importance in the economy of the organism. An *increasing trend* usually signifies behavior fundamental to further development; a *partially increasing trend* may denote behavior, a minor habit, or some

individualistic forms of behavior. A *focal trend* is characteristic of behavior which serves as a temporary scaffolding for a maturing action system, which is discarded when it is no longer useful. Items of *fluctuating trend* are probably in the last analysis a combination of two or more focal items which have not been distinguished in analysis. The appearance of a new behavior item as part of the given pattern represents either the emergence of specific behavior from the total mass or the integration of behaviors formerly unrelated.

Unlike statural growth which as measured appears to be so largely a matter of accumulation or aggrandizement, behavior growth is a process of discarding, replacing, reorganizing and systematizing, as well as extending, behavior. That physical development likewise has these characteristics is of course recognized, but their measurement has been neglected except as they enter into changes in size. By recognizing all classes of behavior items, rather than those of increasing trend alone, opportunity is given for an actual analysis of behavior growth. Furthermore, some of the theoretical and practical difficulties experienced when behavior growth is regarded from merely the accumulative point of view will be avoided.

If we pay heed only to the progressive aspects of growing behavior, we miss the diagnostic value of other indicators of growth status. Consult again Figure 20. A measuring scale based solely on increasing items would make use only of the two following: *Su 5* and *Su 13*. It should be recognized that increasing items simply certify to the lower limit of the possible maturity range of the behavior in question. A *focal item*, however, such as *Su 35*, *Hands active in mutual fingering*, or *Su 37*, *Grasps foot*, delimits the behavior maturity with respect to both an upper and lower age limit. Focal items therefore have a high degree of indicativeness and furnish useful evidence as to the infant's most probable developmental age.

In clinical application, we cannot attach adverse significance to the absence of a focal behavior item, but when it is present it deserves considerable weighting. Focal items afford valuable clinical clues and should be incorporated in any comprehensive system of analysis and appraisal. Decreasing items likewise are of value, particularly at early stages of growth, because they define an upper age limit. The task of appraising the maturity level is much facilitated in a clinical situation if we are able to observe an increasing item and a decreasing item, determining respectively a lower and an upper age limit. It is obvious that we need to devise a method of analysis by which items with

varying growth trends can be fully utilized in estimating behavior age. But there is another aspect of behavior growth which must be considered before we may attempt to estimate growth attainments.

§ 4. CATEGORIES OR FUNCTIONS OF BEHAVIOR

The individual grows as a whole, but he does not grow synchronously with respect to all his varied fields of behavior. He may be lagging in one field and accelerated in another. Language and locomotion usually do not proceed abreast. A child whose gross motor behavior has been seriously retarded by injury or illness may yet display mature manual behavior. A child may comprehend without being able to articulate.

The behavior status of any child can scarcely be expressed in general terms unless his development has been extremely symmetrical. Each field of behavior calls for separate appraisal. This principle was applied in the system of developmental diagnosis described in *The Mental Growth of the Preschool Child*.¹¹ Motor behavior, Language, Adaptive and Personal-Social behavior were set up as distinguishable categories which could be separately evaluated.

The data of the present investigation have led to a similar classification of the fields of behavior, revised as follows:

I. Postural Behavior

1. Postural orientations when (a) supine, (b) prone, (c) sitting, and (d) standing.
2. Postural activity in these positions such as bouncing, kicking, rolling, creeping, walking, and other forms of locomotion or bodily translocation.

It will be noted that this category includes both prelocomotor and locomotor behavior.

II. Prehensory Behavior

1. Contact responses of the hand.
 2. The incidence, manner, and skill involved in (a) approach, (b) grasp, and (c) release.
- This category includes a motor adjustment for the appropriation of objects by hand (and mouth). The items of manipulation are included when the neuro-anatomical maturity of the response rather than exploitation or adaptation is considered. In older children this category would include items of motor skill and manual dexterity.

¹¹ Gesell, Arnold: *The Mental Growth of the Preschool Child*.

III. *Perceptual Behavior*

1. Visual fixation.
2. Anticipatory and selective regard.

Although tactile and auditory perception might logically be included in this category, it has been more convenient to list the items relating to tactile stimulation and kinesthesia under prehension. Likewise, the items relating to auditory perception have been listed under social and language behavior because of the close relationship between hearing and speech. The chief emphasis in this category of perceptual behavior is given to observable items of ocular adjustment which are indicative of visual perception. At early ages the ocular fixation — including focus, extent, duration, and shifts of regard — precede manual approach and furnish important indications of behavior maturity.

IV. *Adaptive Behavior*

1. Exploitation and manipulation.
2. Self-initiated combining and exploitation.
3. Induced behavior.
4. Autonomous learning.

This category includes items which denote discriminative or anticipatory adjustment to immediate and imminent situations. It also includes behavioral evidences of capacity to profit by current or recent experience.

V. *Language-Social Behavior*

1. Reactions to persons.
2. Responsiveness to gestures and speech.
3. Socialized learning and habituation.
4. Language behavior.

Language behavior is here interpreted to include all forms of vocalization, vocal signs, words, and gestures.

§ 5. THE RELATIONSHIP OF BEHAVIOR ITEMS TO BEHAVIORAL CATEGORIES

In accepting the above categories, it must be remembered that they are not mutually exclusive functions but are merely empirical distinctions to assist in the analysis of growth status. It is important to recognize that any one behavior may have a functional significance in more than one behavior category. For example, the item *Pr 16, Scratches platform*, may have prehensory, locomotor, or adaptive connotation. However, generally it has greater significance as an indicator of prehensory behavior. Accordingly, we classify it in that category. Moreover, a given item may take on different categorical value at different ages. An item may have varying functional significance even when displayed by children of the same age. For such reasons discriminative

interpretation must safeguard the application of behavior items in the appraisal of growth.

The plotting of the course of development of a behavior item has the same justification as plotting the growth of crown-heel length, or any other bodily dimension which is a variable composite of different tissues. At different ages, and also in different children of the same age, the relative amounts of various tissues are different; and, just as certain statural measures are affected more by one segment than another, so certain behavior items are more affected by one aspect of behavior than another. Moreover, just as in the study of physical growth the isolation of living tissues from the whole is impossible, so the isolation of particular behavior characters from the whole is impossible. Nevertheless, in the same way that a change in a single bodily dimension is important for the study of bodily changes as a whole, so the developmental change of an item of behavior has significance for the interpretation of the total behavior status. The trend of development of a behavior item retains real meaning, even though at one age it may be grouped with one category and at another age with another category.

These same considerations apply to the estimation of "intelligence." We have used the word sparingly, because its conventional connotations transferred to the age period of infancy might be misleading. There is no doubt that the genetic counterparts and precursors of "intelligence" manifest themselves in the functional fields of perceptual and of adaptive behavior. But the intellectual abilities of the infant and preschool child are less individuated, less specialized than at a later age. The young child functions more as a whole and the evidences of his intellectual potentialities must be sought in the total tide and broad configurations of his behavior as well as in delimited problem solving successes.

The intellectual talents of the older child express themselves more detachedly because they are more completely individuated. Perseverance of attention (ability to adopt and maintain an objective) may mean less in infancy than it does in later childhood. There is no point by point correspondence between the attentional patterns of intelligent behavior in the infant as compared with the pre-adolescent. Intelligence does not grow in magnitude; it changes in form as the child matures.

In summary then, the following points must be borne in mind when we measure behavior growth:

1. Measurement always involves comparison. Comparisons may be stated in descriptive formulations or in precise quantitative terms.
2. The appropriate measuring instrument is the one which is based on the properties of that which is being measured.
3. The growth of behavior is influenced by time factors, and most fundamentally by age.
4. Behavior growth is a changing complex which tends to follow an ontogenetic sequence characteristic of the species.
5. Levels of maturity are manifested in patterns of behavior.
6. These patterns can be analyzed in terms of component behavior items.
7. Behavior growth is not a process of augmentation nor is it merely a process of progressive differentiation.
8. Behavior growth evidences itself in behavior items showing focal, decreasing, and fluctuating trends, as well as in items showing increasing trends.
9. Although at any one time the child behaves as a whole, behavior growth is not uniform; certain aspects or categories of behavior develop with varying degrees of temporal and dynamic independence.
10. Distinguishable categories or fields of behavior therefore should be appraised separately to define behavior status and to evaluate levels of maturity.

CHAPTER XII

ANALYTIC DEVELOPMENTAL SCHEDULE

ON the basis of the principles formulated in the preceding chapter, several methods of utilizing the norms for the measurement of maturity were devised. The developmental schedule and scoring system presented here are considered most appropriate for research purposes, and most safe for clinical use. The schedule may be abbreviated by omitting items which are indicated by a pre-fixed period (.). The brief version is for limited and special uses in experienced hands. The following discussion considers the full schedule which embraces 388 items for 15 age levels from 4 through 56 weeks. This schedule is reproduced in its entirety in Appendix D and in part in the present chapter.

§ 1. CONSTRUCTION OF THE SCHEDULE

For practical use and filing convenience, the developmental schedule is printed on five separate sheets of standard letter-size ($8\frac{1}{2} \times 11$ inches) paper. In this way provision is made for appraising separately the five basic behavior fields or categories, namely, Postural, Prehensory, Perceptive, Adaptive, and Language-Social Behavior. (See Appendix D.) For each category *Increasing*, *Decreasing*, and *Focal items* are listed in separate columns.¹ The first column carries the *Increasing items*; the middle column, the *Decreasing items*; and the right-hand column, the *Focal items*. The items of each column are arranged in age level groups so that by reading *down* the columns, the age order in which these different items of behavior occur may be traced. By reading *across* the columns, the behavior items characteristic of each age level are made apparent.

The age placement of items. The increasing and decreasing items are allocated to the appropriate age levels on the basis of the median or fifty percentile frequency. This standard is equivalent to the norms of physical growth which are customarily stated in terms of a central tendency statistic. Furthermore, the fifty percentile criterion has greater reliability in terms of sampling than

¹ The items for the Language-Social field are grouped in a single column because, with a few exceptions which are indicated, the items are of the *increasing type*.

any other percentile.² Accordingly the *increasing items* have been allocated to the lunar month age when they *first* appear with fifty per cent frequency, and the *decreasing items* to that age at which they *last* appear in fifty per cent of the cases. For convenience we designated the lunar month age to which an item is allocated, the *critical age*. The exact calculated age at which the item is presumed to attain its fifty percentile has been determined by interpolation. This interpolated age also is listed. It does not enter into actual computation but may be used as a normative aid in the final appraisal of maturity level.

The *focal items* are allocated to the lunar month age at which they are most frequently observed. When the focal item does not come to a sharp peak or has two peaks, the ages of approximate focal frequency are given in parentheses following the item and have the same reference value as the interpolated age.

The selection of items. Not all of the items available from the normative data have been included in the schedule. We first selected the items showing the most decisive trend from age to age. When these items were tabulated according to behavior category, age placement, and situation, it appeared that some situations were richer than others in the number of significant items afforded. The less productive situations were discarded in favor of those more productive. In this way the length of the examination was reduced without serious sacrifice of indicative items.

In constructing the schedule it was found that the distribution of usable items was uneven with respect both to types of items and to the number available at different ages. At the younger ages there was a large number of decreasing items; at the older ages, increasing items were relatively more plentiful. The incidence of focal items was uneven. From a logical standpoint it might seem desirable to have the same number of each type of item at each age level. The inequalities may be due in part to the mode of observation, but they also reflect the nature of the growth process itself. The method of scoring presently described is based on a principle of genetic indicativeness and is not dependent upon an absolute number or a symmetric allocation of items.

The method of scoring. The procedures for conducting a developmental examination are outlined in Appendix D which reproduces the various record forms that may be used either for clinical or research purposes. Among these

² Yule, G. Undy: "The influence of fluctuations of sampling on the several percentiles increases as we depart from the median: the standard error of the quartiles is nearly one-tenth greater than that of the median and the standard of the first or ninth deciles more than one-third greater." See p. 338 of *An Introduction to the Theory of Statistics* London: Griffin Co., 1922. Pp. xv + 415.

is a simple form (page 253) for the primary record of the behavior observations. During or immediately after the examination, entries are made in jottings, phrases, or narrative sentences. On the basis of the recorded and remembered behavior, the individual items on the developmental schedule are checked with a plus sign (+) when the item is present; with the minus sign (-) when the item is absent; doubtful items may be indicated by a question mark (?). Pertinent items of tests not administered or not observed may be indicated with a zero (0). When desired, supplementary items and incidental observations may be incorporated into the record in a blank column provided for this purpose (page 258).

The examiner will naturally use his judgment in determining the span of ages checked. This will vary according to the range of scattering of the child's behavior. The import of failures or successes widely divergent from the child's general level of behavior deserves special consideration.

A separate determination of the maturity level must be made for each of the five fields of behavior. In scoring it is advisable generally to proceed in the following order: (1) postural behavior, (2) prehensory behavior, (3) perceptual behavior, (4) adaptive behavior, (5) language-social behavior.

After the plus and minus signs have been entered on the schedule form, the approximate maturity level for any given field of behavior can be determined by inspection. If, in a normative sense, a child has attained complete

MATURITY LEVEL	INCREASING		DECREASING		FOCAL	
24 weeks	Increasing item	+	Decreasing item	-	Focal item	-
	Increasing item	+	Decreasing item	-	Focal item	-
	Increasing item	+	Decreasing item	-	Focal item	-
	Increasing item	+	Decreasing item	-	Focal item	-
28 weeks	Increasing item	+	Decreasing item	+	Focal item	+
	Increasing item	+	Decreasing item	+	Focal item	+
	Increasing item	+	Decreasing item	+	Focal item	+
	Increasing item	+	Decreasing item	+	Focal item	+
32 weeks	Increasing item	-	Decreasing item	+	Focal item	-
	Increasing item	-	Decreasing item	+	Focal item	-
	Increasing item	-	Decreasing item	+	Focal item	-
	Increasing item	-	Decreasing item	+	Focal item	-

FIGURE 21—CHART SHOWING NORMATIVELY IDEAL DISTRIBUTION

and symmetric behavior development at any given age, he will show a correspondingly symmetric distribution of behavior items on the developmental schedule. The diagrammatic chart above pictures a *normatively ideal distribution of scored behavior items in a 28 weeks old infant of perfectly symmetrical maturity*.

This normatively symmetric infant of 28 weeks old maturity will have in his behavior equipment all of the items (increasing, decreasing, and focal) appropriate to 28 weeks. He will also have in his behavior equipment all the increasing items *prior* to the age of 28 weeks but none of the increasing items *beyond* that age. However, since the decreasing items have a converse genetic significance, he will have no decreasing items of levels *younger* than 28 weeks, but he will have items found at ages *beyond* 28 weeks. Since focal items are limited to a narrow range, he will typically have no such items in his behavior equipment below or above his chronological age level of 28 weeks. Such a normative paragon would have a perfectly balanced score sheet.

§ 2. INSTRUCTION FOR USE OF THE SCHEDULE

An illustrative case. The principle which underlies the method of scoring has been outlined in terms of a normatively symmetric subject. In actual life, however, no infant ever embodies such perfect symmetry. Let us, therefore, turn to actual life and illustrate the method of scoring maturity levels of the postural behavior of Infant G 44 at the age of 28 weeks. Our primary observation record of this postural behavior supplies us with the following data:

OBSERVATION RECORD OF BEHAVIOR

Name. Infant G 44	Age: 28 weeks	Date: 12/3	CCD No.
Exam. place: CCD photographic dome	Began: 2.08	Ended: 2.36 p.m.	Observer: CS Examiner: AG

Pre-examination behavior and adjustments: Examination began at 1:33 and child reacted until 1:40 when she started to fuss. Bottle (2 oz.) given at 1:55.

SITUATION	BEHAVIOR
<i>Postural Behavior</i>	
SUPINE	Child lies with legs drawn up, right heel on left ankle, legs outwardly rotated. Extends legs suddenly, then draws them up and rolls to right side, then completely prone Replaced supine, object placed at left side: Rolls left but not completely prone left arm prevents it. As she rolls to supine, she moves downward in crib.
PULLED TO SITTING	Head is lifted, arms flexed, legs slightly flexed, head held in line with body. Easily pulled.
SITTING	Sits alone momentarily but not erect; lumbar slump. Leans forward, arms extended, hands on platform between legs, legs slightly flexed. Maintains balance momentarily, then trembles. Reported to fall to right.
STANDING	Momentarily supports weight, then both legs flex and child sits.
PRONE	Arms extended, hands on platform, shoulders lifted about 2 5 inches from platform but head is not raised to vertical. Arms are drawn backward, child maintains raised position of the head by hyperextension of the trunk.

When the behavior items explicit and implicit in the foregoing record are entered on the developmental schedule, we arrive at a somewhat asymmetric distribution of increasing, decreasing, and focal items. The actual distribution of these observed items as recorded for Infant G 44 is shown on the section of the Developmental Schedule reproduced on page 211 (Fig. 22). On the basis of the plus and minus signs of this record, it is now possible to analyze the maturity status of the postural behavior of this 28 weeks old infant.³

Analysis of maturity status. The procedures for such an analysis include the following steps.

- (1) INSPECTION to determine two distinctive and adjacent age levels from which to reckon deviations.
- (2) LISTING of the number of items showing deviations of (L) less maturity and (M) more maturity than the two basic reckoning ages.
- (3) DERIVING a composite maturity age based on the ascertained deviations.
- (4) SPECIFICATION of the more significant deviations by descriptive notation.
- (5) SUMMARIZING appraisal of the maturity status in five behavior fields.

The detail in which the above steps are carried out will naturally vary with the demands of a given case and with the objectives, whether clinical or research. Persons of limited clinical experience with the method should generally make the full calculation of the composite age, even though the apparent precision of this age needs interpretive qualification.

For the sake of brevity and clarity, successive steps will now be formulated as direct instructions printed in italics.

1. *INSPECTION* to determine two distinctive and adjacent age levels from which to reckon deviations.

Scan the column of increasing items from the top down and determine the lunar age level where the aggregate plus signs gives way to a preponderance of minus signs.

This is quite clearly the age of 28 weeks.

³ The behavior of this infant has been abundantly illustrated in Volume One of *An Atlas of Infant Behavior*, loc. cit. See particularly p. 219 ff.

POSTURAL BEHAVIOR

Date: 12-3-

Age: 28 weeks

Name: Infant G 44	I — Increasing Items			D — Decreasing Items			F — Focal Items		
4				St 11 Legs flexed, not extended	4.5	-			
6	Pr 7 Lfts head to Zone 2 Pr 1 (Ventral suspension) Head compensates per 6 kicks of blankets	4.5	+	Pr 2 Head rotates (placemont) St 1 Head saggs St 4 Head sags, erect only momentarily St 16 Supports no weight	6.5	-			
8	Ir 5 Holds head lifted sustainedly	7.5	+	St 1 Head sags Su 43 Legs extend briefly Su 51 Legs flexed, lifts & lowers Su 22 One arm extended	9	-			
12	St 8 Head set forward or erect Su 12 Arms symmetrical Pr 8 Lfts head to Zone 3	9	+	St 8 Back uniformly rounded Su 9 Arms predominantly in t-r-position Su 1 Head predominantly rotated Pr 10 Hips raised	13	-			
16	Su 13 Arms prominently symmetrical Su 5 Head predominantly in midposition. Pr 14 Lfts hand Si 6 Head steadily erect	14	+	SAP 1 Head hangs	14	-			
20	SIC 2 Head erect and steady Ra 51 Rolls to side Si 6 Head erect when leans forward Pr 13 Arms extended	18	+	Su 16 Arms flexed Su 21 Falls forward	22	-			
24	Pr 24 Head on hands Si 29 Sits unsupported SiC 6 Body erect	23	+	SIC 4 Body slumps to side Su 42 Legs flexed, outwardly rotated Su 39 Legs predominantly flexed	27	+			
28	Pr 9 Lfts head to Zone 4 Si 11 Body erect Si 20 Supports large frac of wt, more momen SiP 13 Assists Ex by pulling self forward	27	-	Pr 11 Arms flexed	30	-			
32	Si 21 Supports entire weight Si 17 Sits one minute or more Pr 38 Pivots	30	+	Si 24 Leans forward passively	33	+			
36	Si 32 Erects self from leaning forward Si 13 Body erect one minute or more Si 18 Sits for ten minutes or more Si 62 Rolls prone, or attains sit, g. sit assist	33	-	Si 20 Falls	37	+			
40	Si 19 Sits for indefinite period Si 33 Rolls to prone or attains sitting Pr 37 Flexes leg, drawing up knee	37	-	Pr 30 Rests only on thighs, lower abd , hands	37	+			
44	Pr 31 Assumes creeping position Pr 44 Pushes upward and backward to sitting Pr 40 Processes St 33 Lifts foot while supporting entire weight	41	-	St 27 Sits unsteadily St 27 Stands on toes St 15 Hips flexed, legs held extended	36	-			
48	St 46 Cruises or walks using support Pr 42 Creeps Si 38 Pulls to standing St 45 Lovers self using support	45	-	St 37 (Hands supported) Balance inadequate Pr 39 Regresses	40	-			
52	St 47 Walks using support	49	-	Pr 32 Assumes quadrupedal position	44	-			
56	St 40 Stands independent, without support Si 41 Attains standing independently (r) SiC 4 Summits fourth tread	54	-	R-S 36 Turns or pivots St 23 Feet apart 4 inches or more	52	-			

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Similarly scan the column of decreasing items and determine the lunar age level where the aggregate of minus signs give way to a predominance of plus signs.

This proves to be the age of 24 weeks.

Similarly scan the column of focal items and determine at what age level plus signs predominate.

They are equally present at 20, 24, and 28 weeks.

On the basis of this inspection we have already arrived at an age zone which broadly characterizes the maturity level of the postural behavior, namely, the 24-28 weeks zone.

This is an approximate, but valid characterization of maturity status. Indeed it formulates what greets the eye on inspection. The checked schedule sheet itself is virtually a scatter diagram, which automatically graphs the genetic placement of the various items of observed behavior.

In the second step of scoring we merely give numerical expression to the scatter of the items in relation to the two reckoning ages which have already been selected, at least provisionally, by inspection.

The indicators of more maturity will be presently listed with a plus sign. The indicators of less maturity will be listed with a minus sign. Occasionally inspection may fail to select on the first trial the two successive ages where the score values change from plus to minus. A second trial then suffices to determine these reckoning ages.

2. *LISTING* the number of items showing deviations of (L) less maturity and (M) more maturity than the two basic reckoning ages.

At this point it is well to recall the perfectly balanced distribution of scores which diagrammatically represents a normatively symmetric infant (page 208). For we are about to count up the deviations from such an ideal symmetry, first on the basis of an imputed level of 24 weeks; and then on the basis of an imputed level of 28 weeks. These two tallies are recorded on the analytic scoring sheet (see page 259), a portion of which is reproduced on the following page.

Look first for all items which indicate a maturity of LESS than 24 weeks.

(a) *Scan the column of increasing items up through 24 weeks and count all that are scored minus.* (There is 1 such item: Pr 8, at 12 weeks.)

(b) *Scan the decreasing items up to 24 weeks and count all that are scored plus up to 24 weeks.* (There is no such item.)

(c) Scan the focal items up to 24 weeks and count all that are definitely plus. (There is no such item. The item Pr 28 is also characteristic of 28 weeks and should therefore be disregarded.)

Add up these indicators of Less maturity. Enter the total number (1) in the column designated L on the scoring sheet, against the reckoning age of 24 weeks.

Name: G 44 Age: 28 wks.

ANALYTIC SCORING SHEET

Reckoning Ages	Items	-	L	+	M	Sum	POSTURAL BEHAVIOR
24 wks.	i		1	5			<u>Less mature behavior</u>
	d			1			Sits only momentarily, leaning forward (24)
	f			1			Prone, head raised to zone 7 only (12)
	Totals		-1	+7	+6		
28 wks.	i		3	3			<u>More mature behavior</u>
	d		2	1			Standing supports entire weight (32)
	f		1				Rolls supine to prone (36)
	Totals		-6	+4	-2		
Reckoning Ages	Items	-	L	+	M	Sum	PРЕHENSORY BEHAVIOR
	i						<u>Less mature behavior</u>
	d						
	f						
	Totals						

FIGURE 22

Section of scoring sheet showing tabulation of items in the field of postural behavior. A maturity level of 28 weeks is derived. Noteworthy items of postural behavior *less mature* than 28 weeks and *more mature* than 28 weeks are recorded.

Look next for all items which indicate a maturity of MORE than 24 weeks.

(a) Scan the increasing items beyond 24 weeks and count all that are scored plus. (There are 5 such items: St 20; SiP 13; St 21; Su 62; Su 63.)

(b) Scan the decreasing items at and beyond 24 weeks. Count all that are scored minus. (There is 1 such item: Pr 11.)

(c) Scan the focal items beyond 24 weeks and count all scored plus. (There is 1 such item: Si 28.)

Add up these indicators of More maturity. Enter the total number (7) in the column marked M on the scoring sheet.

Now shift to the next reckoning age (namely 28 weeks) and repeat the above procedures in terms of 28 weeks.

Look first for all items which indicate a maturity of LESS than 28 weeks.

(a) *Scan the column of increasing items up through 28 weeks and count all that are scored minus.* (There are 3 such items: Pr 8; Pr 9; Si 11.)

(b) *Scan the decreasing items up to 28 weeks and count all that are scored plus.* (There are 2 such items: Su 42; Su 39.)

(c) *Scan the focal items up to 28 weeks and count all that are plus.* (There is 1 such item: Si 15.)

Add up these indicators of Less maturity. Enter the total number (6) in the column designated L on the scoring sheet, against the reckoning age of 28 weeks.

Look next for all items that indicate a maturity of more than 28 weeks.

(a) *Scan the increasing items beyond 28 weeks and count all that are scored plus.* (There are 3 such items: St 21; Su 62; Su 63.)

(b) *Scan the decreasing items at and beyond 28 weeks. Count all that are scored minus.* (There is 1 such item: Pr 11.)

(c) *Scan the focal items beyond 28 weeks. Count all scored plus.* (There is none.)

Add up these indicators of More maturity. Enter the total number (4) in the column designated M on the scoring sheet, against the reckoning age of 28 weeks.

3. DERIVING a composite maturity age based on the ascertained deviations.

We now have before us a box score of the number of items which deviate from the two reckoning ages. At the age of 24 weeks there is 1 minus deviation (\bar{L} column) versus 7 plus deviations (\bar{M} column).⁴ In other words there are 6 more indications of greater maturity than of less maturity and the algebraic sum +6 is recorded in the adjoining column.

At the age of 28 weeks there are 6 minus deviations versus 4 plus deviations. That is, there are two more indications of less maturity than of greater maturity, and the algebraic sum -2 is recorded in the appropriate column.

⁴ Occasionally an increasing item will also appear on the schedule as a decreasing item negatively formulated. In these exceptional instances, only one of the equivalent items should be reckoned in the tabulation of the final scores.

From the foregoing composite and comparative determinations it is evident that the postural behavior of this child is in general more mature than 24 weeks and less mature than 28 weeks. The scores also disclose that the level is nearer 28 weeks than 24 weeks. On the basis of a gradient of 24 weeks, 24 weeks plus, 28 weeks minus, 28 weeks, 28 weeks plus, we shall designate the general maturity level (for postural behavior) as 28 weeks minus (28 - weeks). For the age period from 4 weeks through 56 weeks there are 45 available gradations.

A maturity level may always be expressed in terms of a plus or minus shading of a lunar month interval. Such a shading is sufficiently refined for clinical purposes. If a more refined though actually not more valid designation is desired, the maturity level may be expressed in terms of weeks by interpolating between the limiting lunar months. The mathematical procedure for interpolation is described in a footnote.⁵ Even when such interpolated values are utilized for quantitative or statistical purposes, the normative limitations of composite maturity ages must be acknowledged.

Occasionally the number of minus indicators (Less maturity) will be equal to the number of plus indicators (More maturity). The interpolated value then lies exactly midway between the two reckoning ages and needs no calculation.

4. SPECIFICATION of the more significant deviations by descriptive notation.

Having derived a composite maturity age for its simplifying convenience, it is important to note any behavior which is definitely at variance with that age. At best a single formula of maturity level is misleading unless qualified by critical interpretation.

⁵ FORMULA FOR INTERPOLATING TO FIND AGE OF ZERO SCORE If a_1 and a_2 are the consecutive (reckoning) ages for the period when the score values change from plus to minus, and if

$$\begin{array}{ll} a_1 = \text{age 1} & a_2 = \text{age 2}, \\ S_1 = \text{score, age 1} & S_2 = \text{score, age 2 and} \\ & ax = \text{age zero score,} \end{array}$$

then,

$$\text{age zero score, } ax = a_1 + \frac{S_1 (a_2 - a_1)}{S_1 - S_2}$$

Referring to example, page 213, the score changes from plus to minus between 24 and 28 weeks. Then:

$$\begin{array}{l} a_1 = 24 \text{ (age in weeks),} \\ S_1 = + 6 \text{ (score value at 24 weeks),} \\ a_2 = 28 \text{ (age in weeks), and} \\ S_2 = - 2 \text{ (score value for 28 weeks)} \end{array}$$

Therefore

$$ax = 24 + \frac{6 (28 - 24)}{6 - (- 2)} = 24 + \frac{24}{8} = 27 \text{ weeks}$$

Scrutinize the developmental schedule and select any items which show marked divergence from the derived age level. In brief phrases record these items on the analytic scoring sheet indicating in parentheses the critical age of each such item. Record separately the items indicating less mature behavior and items indicating more mature behavior.

For example, in the illustrative case of G 44; the following items might be noted and entered in the summary scoring sheet, as shown on page 213.

Less mature behavior

Sits only momentarily, leaning forward.
Prone, head raised only to Zone 2.

More mature behavior

Standing supports entire weight.
Rolls supine to prone.

5. SUMMARIZING appraisal of the maturity status in five different fields of behavior.

Proceed in the above manner for each of the four remaining fields of behavior. Make all the entries on the analytic scoring sheet (Appendix D) as previously indicated.

These entries, which have now been assembled on the analytic scoring sheet, serve as an epitome of the analytic determinations. If necessary the various scores may be transferred to a biogram on a summary face sheet, as suggested in Appendix D. But the summarizing score sheet compactly conveys the essential findings. The findings can be further combined and critically appraised in terms of specific clinical or research requirements. The degree to which the maturity ages are generalized will also depend on these requirements.

Assume that in the illustrative case before us, maturity ages were finally assigned as follows:

Postural behavior	28 - weeks
Prehensory behavior	28 + weeks
Perceptual behavior	28 weeks
Adaptive behavior	28 weeks
Language behavior	32 weeks

It is never desirable to average these disparate ages. This would lead to oversimplification. In the task of genetic analysis it is hazardous to resort to short-cut devices because the data are innately so complex and our methods too inadequate for such complexity.

In clinical situations, it is, therefore, wiser to be content with a summarizing statement which succinctly reports the separate determinations for each field of behavior and comments on the symmetry and the deviations in the total behavior picture.

The detail of such comment again will vary with the exigencies of the case. For example, with respect to the postural behavior of G 44, we may choose to comment on the idiosyncrasies of the prone behavior. Are the idiosyncrasies benign and negligible? They may have import for genetic study, if not for appraisal of normality of maturity status.

Here is a child (G 44) who is muscularly well developed; but in the prone position, at the age of 28 weeks, she does not rear her head beyond Zone 2; whereas the normative 16 weeks old infant lifts it to Zone 3.

Does this mean an abnormal retardation in head control? Probably not, because when sitting in a chair she holds her head erect and steady (20 weeks). Moreover some of her postural behavior in the supine and standing situations is actually advanced. She can even roll from supine to prone. Is it possible that this very advance in supine behavior has inflicted a somewhat unusual distortion on the pattern of head control? We shall not overlook her "failure" to lift her head to Zone 3; but we shall not unduly penalize her for this discrepancy. Certainly we shall not naively rate this failure as equivalent to the immaturity of head control of a 12 weeks old infant. In computing a maturity age level we may, however, classify the failure as an indicator of immaturity. This particular deviation is too definite and interesting to be ignored; it deserves consideration. We use it here as an example of the need of supplementary interpretation. To the uninitiated this example may also serve as a caution. Discrepant deviations whether in the direction of less maturity or more maturity should not be uncritically regarded as infallible symptoms of subnormality or "superiority" as the case may be.

Systematic discussion of the significance of asymmetrical behavior items, would take us too far beyond the scope of the present volume. A general outline of clinical procedures (with additional precautions) is offered in the final chapter and the Appendix. The present chapter may properly conclude with a general statement on the validity, accuracy and limitations of the analytic developmental schedule.

§ 3. THE VALIDITY, ACCURACY, AND LIMITATIONS OF THE ANALYTIC DEVELOPMENTAL SCHEDULE

There are three questions which those who contemplate using the schedules will wish answered: (1) Does the schedule measure what it purports to measure? (2) How accurate is the measurement which it yields? (3) How accurately does this measurement predict subsequent behavior?

The first question, that of validity, assumes a criterion with which the measurements of maturity levels may be compared. We have no such criterion. The criteria frequently employed, namely the judgments of an experienced person, or measurements on a comparable scale, are not altogether adequate. Agreement of measurements made on two different scales might merely mean that both scales had used similar methods and were subject to similar errors. Agreement between the judgments of an experienced person and the measurements arrived at by the use of the schedule would, however, have more value. We should seriously question any schedule which gave determinations at marked variance with clinical judgments based on close knowledge of the infant's maturity.⁶

Fundamentally the validity of the schedule here offered depends on the validity of the norms, the legitimacy of the category classifications, the appropriateness of each item for the category to which it is allocated, the soundness of the concept of maturity level, and the justness of using a sample of the child's behavior to indicate that level. These issues have been discussed in previous chapters. Our conclusions regarding them go beyond experimental data and are based on years of clinical experience. We are justified in claiming their general soundness and practical applicability until contrary evidence is revealed.

The second question, that of accuracy, has no meaning unless the schedule is valid. For purposes of discussion we must therefore assume that the schedule really does render standardized evaluations of the postural, prehensory, perceptual, adaptive, and language-social behavior of the child.

Inaccuracies of measurement arise from three sources: (1) systematic errors such as imperfections of the scale, personal errors of the examiner, and other irregularities of method; (2) mistakes, blunders, and all gross errors; (3) accidental or chance errors. The statistical theory of errors applies only

⁶ We have investigated the degree of correspondence between the ratings on the analytic developmental schedule and the judgments of the examiner. In Appendix A the results of this comparison are shown by graphs in the case of an infant who was examined at frequent intervals.

to the third source of error. Frequently researchers appear to consider this third source of error exclusively, whereas in the field of mental tests particularly, systematic errors are of far greater moment. Thus, quoting from Scarborough⁷ "If the systematic error should happen to be large, a precise measurement might be very inaccurate. The accuracy of a measurement can be increased by using more refined instruments and methods whereas the precision⁸ can be increased only by using more care in making the measurement."

It is the systematic error which we have tried to reduce by basing the schedule on a carefully planned and controlled study of infant behavior. The extent to which we have succeeded will not be demonstrated by ascertaining reliability as tested by any one of the three correlations,⁹ or by computing standard errors, however important these statistics may be for quite other purposes. Instead, the accuracy of the schedule resolves in last analysis to the question of the accuracy of each item of the norms. The accuracy of the percentages derived from the normative study has already been discussed. We concluded that a difference of less than 10 per cent in a percentage value was of questionable import. Thus an item with percentages of 41, 50 and 60 at successive age levels might be placed 4 weeks too early or 4 weeks too late. The chance errors of a maturity level determined by the passing or failing of several items are inversely proportional to the square root of the number of items involved, assuming that in a genetic sense these items are on a par with respect to developmental indicativeness. Thus, the maturity level of an infant's postural behavior can be more accurately determined than the maturity level of his social behavior, because of the greater number of items with reference to posture.

It is not possible to calculate to what extent chance errors will distort the measurement of maturity level, since the various items of behavior are by no means uncorrelated and since we do not know what relationships are involved. At the present time, therefore, a common sense estimate of the errors involved in each particular instance is preferable to any general formula of reliability which might be adopted.

Ultimately, the values of the schedule will depend not only on its validity

⁷ Scarborough, James B.: *Numerical Mathematical Analysis* Baltimore: Johns Hopkins Press, 1930 Pp. 317.

⁸ $h = \frac{1}{\sigma\sqrt{12}}$ (author)

⁹ Thurstone, L. L.: *The Reliability and Validity of Tests* Ann Arbor, Mich · Edwards Bros , 1932.

and precision, but also on the clinical usefulness of the schedule for the orderly characterization, systematic interpretation, and prediction of behavior. These values cannot be demonstrated in this volume but will be considered in a later publication. A study now in progress relates the analysis of behavior in infancy to the behavior of the same individuals at the 5 and 10 year age levels. It is only by such long-time, longitudinal studies of behavior that the real merits of a system for the genetic analysis of infant behavior can be more fully defined. The clinical possibilities and limitations of developmental prediction will be indicated in the concluding chapter.

CHAPTER XIII

CLINICAL APPRAISAL OF BEHAVIOR STATUS

§ 1. PROCEDURES FOR DEVELOPMENTAL DIAGNOSIS

THE clinical appraisal of the behavior status of an infant is always a relative task. The procedures used will naturally vary with the complexity of the problem and the circumstances of the examination, to say nothing of the acumen of the examiner. Sometimes he may be able to tell at a glance whether the infant presents a normal or a defective behavior picture; other times it may take him hours to make a discriminative or a differential diagnosis, and even then he may have to make a diagnosis provisional and contingent upon follow-up examinations.

No attempt will be made in this chapter to describe a single standard procedure for conducting an examination. The clinical uses of (1) the Analytic Developmental Schedule, (2) the Maturity Level Summaries, and (3) the Functional Syllabus have been outlined in previous chapters. Record forms which have been used in the clinical and research work of the Yale Clinic of Child Development are reproduced in the Appendix as follows:

- *1a. Introductory Report
- 1b. Medical Report
- *2. Supplementary Behavior Interview
- *3. Observation Record of Behavior
- *4. Analytic Developmental Schedule
- 5. Analytic Scoring Sheet
- 6. Record of Behavior Individuality
- 7. Anthropometric Record
- *8. Summary Face Sheet
- 9. Follow-up Report
- 10. File Folder

Asterisks indicate those forms which are considered a minimum essential for a diagnostic record. In actual application these forms may be used in a flexible manner and may be adapted to varying requirements of thoroughness and detail. Appendix D supplies general and specific directions for the uses of the different forms.

§ 2. DIAGNOSIS AND PROGNOSIS

Elsewhere¹ we have summarized the numerous complications which place limitations upon the developmental diagnosis of infant behavior. Part of the task of the examiner is to recognize these limitations and to evaluate them. Clinical appraisal is always a relative task and can take due account of the short-comings of method and the obscurity of symptoms whenever necessary. Diagnosis does not demand a hard and fast categorical classification. It calls for interpretive characterization. This characterization may be so difficult in some instances that it must be built up in a cumulative manner by a series of examinations. The examiner who boasted that he never made a false diagnosis, but that he often added to a previous one, offers a good practical hint, even though he was not a perfect model of infallibility.

The behavior status of the infant is too complex to be observed in one sweeping glance or to be generalized in a single formula. A developmental diagnosis, therefore, should attempt to specify the significant forms of behavior of which the infant is capable. Graded norms enable us to identify these forms and to assign to them an approximate maturity value. The norms constitute a frame of reference against which the observed data can be projected. In this way we gain a sense of the maturity status at any one age. A similar survey of the infant's behavior at a subsequent age gives additional evidence as to the progression of the complex of growth. One diagnosis thus becomes a check upon the other; and both together may define a given sector of growth. In the very nature of things, attained growth is an indicator of past growth processes and a foreteller of growth yet to be achieved.

The integrative character of growth and its inherent lawfulness theoretically make the scope of diagnosis and prediction extremely wide. Clinical experience can do much to make up for present limitations in method. Or, more positively stated, clinical experience greatly enhances the usefulness and the trustworthiness of diagnostic criteria. This is true of all fields of diagnosis, even where precise quantitative techniques are available. It must be doubly true with respect to the diagnosis of developmental status.

The diagnostic utilization of norms of behavior not only requires clinical caution but a judicious respect for medical conditions which may complicate

¹ Gesell, A., and Thompson, H., assisted by Amatruda, C. S.: *Infant Behavior: Its Genesis and Growth*. New York: McGraw-Hill. 1934. Pp. viii + 343. (See Chap. VI, pp. 326-333.)

or determine a behavior picture. For this reason the most fundamental diagnostic procedures in the field of behavior can be undertaken only in close co-ordination with other forms of clinical medicine. The normative appraisal of behavior status then becomes an extension of clinical neurology.

No attempt will here be made to discuss the pediatric aspects of behavior diagnosis.² Such a discussion, if carried to its conclusions, would expand into a treatise on the behavior symptomatology of disease, developmental defects, and a long list of clinical entities. To a large extent this behavior symptomatology remains uncharted and ill defined because the behavior characteristics of infants are not yet systematically recorded as part of medical procedure. We may be certain that a more careful study of infant behavior, both in health and disease, will prove that patterns of behavior are sensitive indicators of the biological assets and liabilities of the individual. For this reason the normative appraisal of behavior status, in conjunction with other biometric techniques, must finally come into the province of clinical pediatrics.

A mere enumeration of the complications which must be considered in various forms of atypical or abnormal growth will serve to point the need of clinical wariness. In young infants the true, postconception age may be indeterminable. Is the infant full term, premature, immature (subnormal in weight), or postmature? Does race or diet have a significant effect upon the gestation cycle, and indeed on the postnatal cycle? How does the complex of behavior growth adjust to the adversities of premature birth, to prolonged malnutrition, to specific starvations, to allergies, to infections, to dehydration, to disturbances of acid-base balance, to mineral and vitamin deficiencies? Are all fields of behavior equally and symmetrically affected by any given abnormality? Does postural or adaptive behavior suffer? Does the infant present specific lags and accelerations among the components of his behavior equipment? Are his behavior peculiarities attributable to faulty correlations and excessive fluctuations? Does he suffer from anxiety due to trauma, to insufficient attention, to hospitalization, to institutionalization, or to sheer nutritional impairment? Does some unnoted sensory defect or abnormality disturb the course of natural growth and the constellation of his behavior

² The relationship of behavior diagnosis to the supervision of infant feeding is discussed concretely in a separate volume. Gesell, Arnold, and Ilg, Frances: *Feeding Behavior of Infants A Pediatric Approach to the Mental Hygiene of Early Life* Philadelphia. Lippincott 1937 Pp ix + 201. The data and procedures in this volume are based on periodic surveys supplemented by cinema records. The growth of feeding behavior is delineated in 132 action photographs. Diagnostic indicators of the maturity of feeding behavior are outlined for successive ages from the neonatal period through the second year.

characteristics? Perhaps some temporary fatigue, discomfort, or some recent unpleasant experience colors his behavior. Or do deep seated constitutional factors account for his hyperactivity, his extensor tendencies, his lethargy?

Is he by chance suffering from a birth injury? He may suffer from such injury, even if he has not gone into convulsions and presents no signs of paralysis or even of neurologic deviation. The varieties of birth injury are legion. A mystifying failure of development may be due to some local deficiency of blood supply or some deficient aeration of the blood, associated with prolonged labor. The wide expanse of the cortex (it is said to have a hundred histologically distinguishable types of structure) and of the basal ganglia alone offer innumerable sites of possible damage. Such damage may be permanent. Sometimes it may be overcome. The residuals of selective brain injury may then distort the behavior picture for months, but a corrective or compensatory growth process steadily restores the child toward normality. The tendency toward improvement is fortunately more frequently observed than a tendency toward deterioration. The tendency toward balance and toward optimum is greater than the reverse, because the regulation of the total growth complex is protected by factors of morphogenetic insurance, which work toward an optimal realization even of impaired potentialities.

Neurological complications and endocrine disturbances are of particular importance. The former influence the integrity of behavior patterns and of behavior mechanisms. The latter affect the rate of development and the mobilization of energy. The two types of complications of course may be closely related. This is illustrated with classical clearness in cretinism. The cretinous infant develops slowly; he reacts slowly. He responds to thyroid therapy which supplies him with missing metabolic and growth regulators. But his response to treatment is an individual matter, apparently dependent on the residual capacity and the remaining growth potency of his neuro-endocrine system. Accordingly, one infant responds favorably to treatment; another responds meagerly. If he responds promptly he is likely to respond fully, for this is a token of his developmental reserves. As in cretinism, so in all atypical growth conditions, we are dealing with a dynamic complex which is sensitive to environmental influences, but which is fundamentally regulated by intrinsic determiners.

A normative-analytic approach to this living complex recognizes the intricacy and the fluidity of the growth process. Diagnostic prudence is re-

quired at every turn. But prudence need not be carried to an agnostic extreme because the complex of growth is governed by inherent maturational mechanisms which carry every infant toward an optimal. These mechanisms are lawful. Herein lie the possibilities of prognosis as well as of diagnosis; for where there is lawfulness there is potential prediction.

APPENDICES

- A. A COMPARISON OF EVALUATIONS OF BEHAVIOR MATURITY BY DIFFERENT METHODS
- B. BIBLIOGRAPHY OF YALE FILMS OF CHILD DEVELOPMENT
- C. INCLUSIVE ROUTE SCHEDULE OF BEHAVIOR SITUATIONS
- D. CLINICAL AND RESEARCH RECORD FORMS
- E. NORMATIVE SUMMARIES OF PRESCHOOL DEVELOPMENT
- F. GLOSSARY

APPENDIX A

A COMPARISON OF EVALUATIONS OF BEHAVIOR MATURITY BY DIFFERENT METHODS

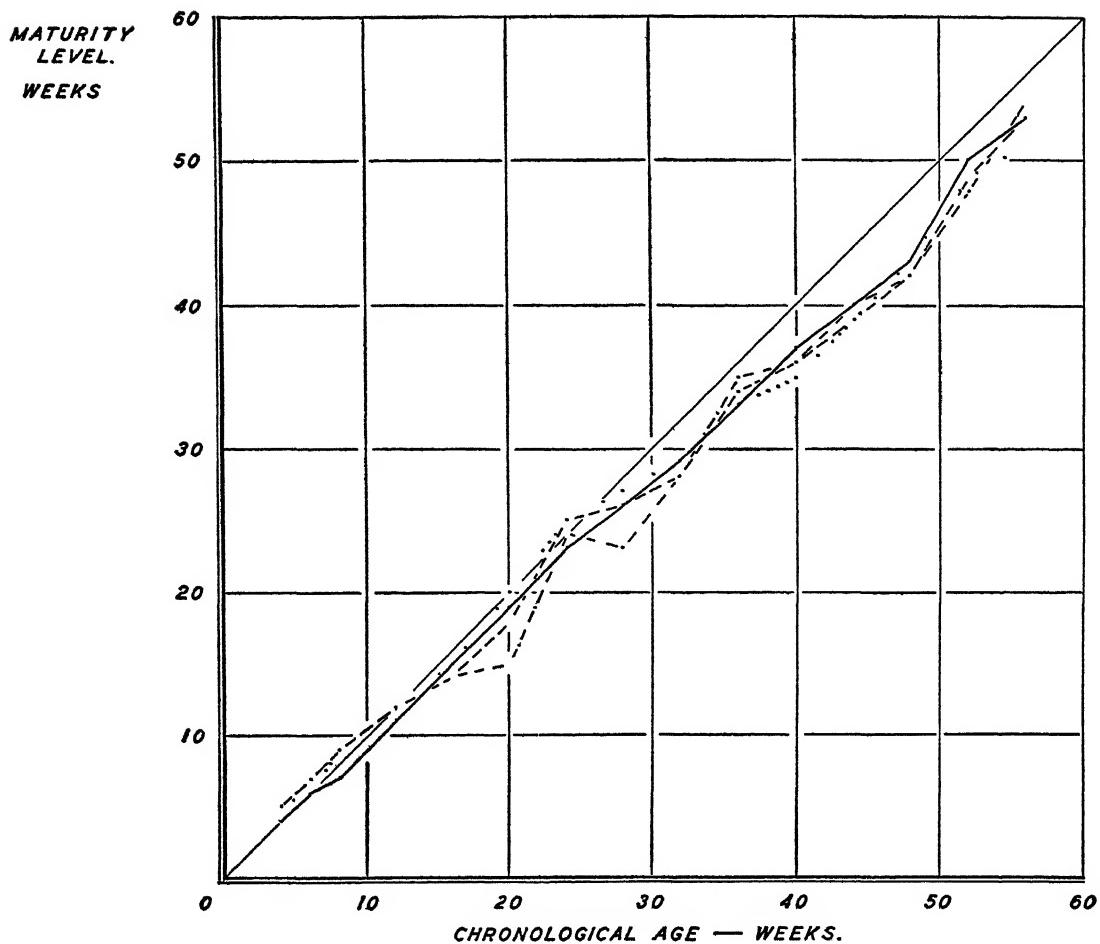
THE Analytic Developmental Schedule described in Chapter XI was adopted as the most desirable after two other forms had been tried out. A more elaborate device, which used a method of weighted scoring, failed to yield any marked increase of reliability and was too cumbersome for ordinary applications. For the reader's information, this method of weighting scores will be presently outlined. The abbreviated version of the Analytic Schedule, on the other hand, sometimes gave values which were at appreciable variance with the examiner's judgment and with those rendered by the more complete schedule.

Comparisons of evaluations of the behavior maturity were made on a selected group of normative infants who had been examined and photographically recorded at frequent intervals. For illustration we present graphs of Infant X whose maturity level was determined at fifteen age periods from 4 through 56 weeks. A separate graph for each of the five behavior fields (Figs. 23-27) shows the determinations of maturity level in terms of (a) the standard analytic developmental schedule,¹ (b) the abbreviated version of this schedule, (c) the standard schedule with weighted scoring, and also (d) the examiner's estimates based upon normative examinations. To increase the objectivity of the comparison of methods, the determinations on the three schedules were made by a person not conversant with infant behavior, but schooled in the definition of the recorded behavior items from the dictated protocols of the examiner.

It is obvious from inspection of the graphs that the determinations made by the abbreviated schedule at some ages deviate as much as a month from those made by the other two schedules. The determinations made by the standard schedule conform very closely to those made by the tedious method of weighted scoring.

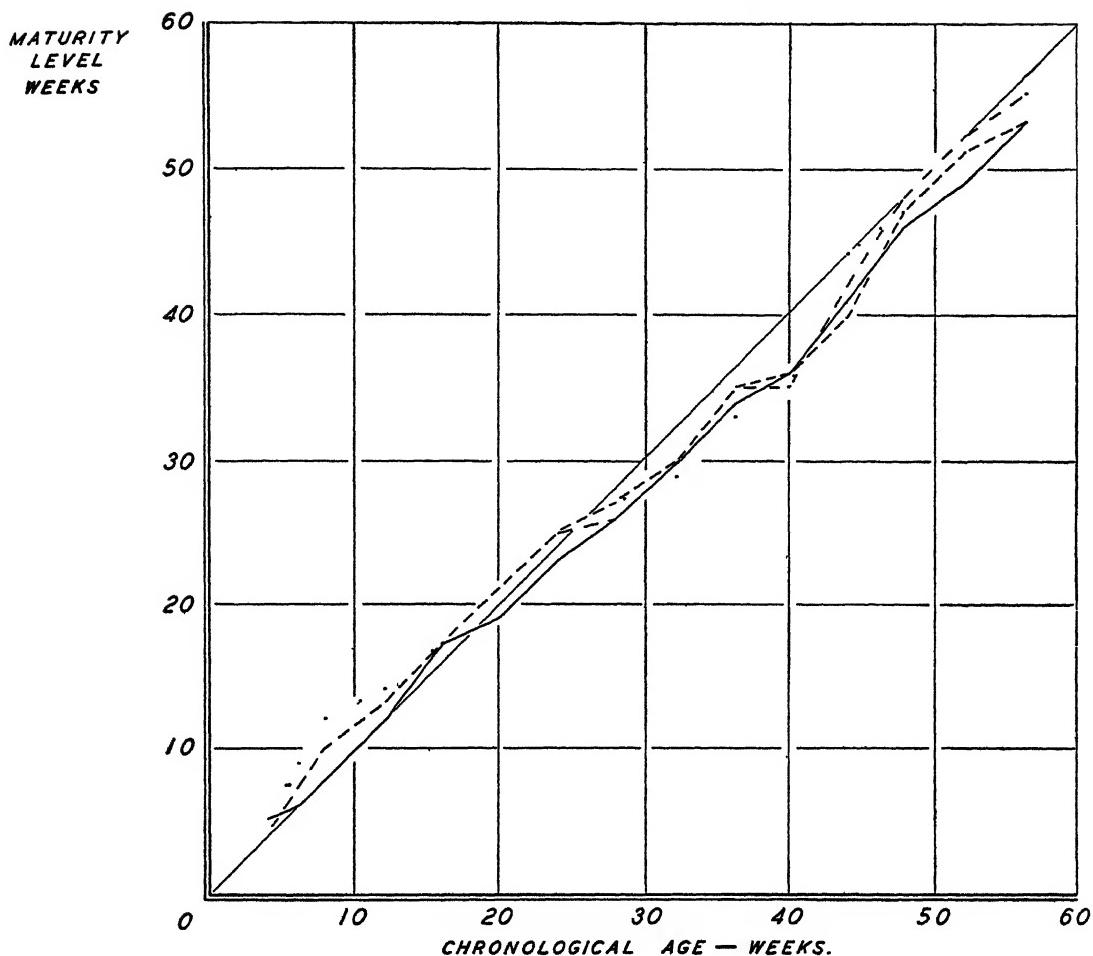
The principles and procedures of this method are herewith summarized for those who may be interested. The Analytic Developmental Schedule makes use of the critical age and the trend of each behavior item. The method of weighted scoring utilizes these same items, but weights the value of every individual item in accordance with the percentage of children at each age who display the item. Such weighting aims at a more discriminating utilization of the original normative data. The percentage frequencies give us not only the critical age and

¹ The standard Analytic Developmental Schedule is reproduced on pages 254-8 in Appendix D. The abbreviated version of this schedule is also indicated. Each item on the schedule is specified by number which also identifies the item as presented in the normative tables of Chapter VII. A dot (.) preceding an item means that in the abbreviated version this item was omitted.

POSTURAL BEHAVIOR.COMPARATIVE GRAPH SHOWING DETERMINATIONS OF
MATURITY LEVELS BY DIFFERENT METHODS.

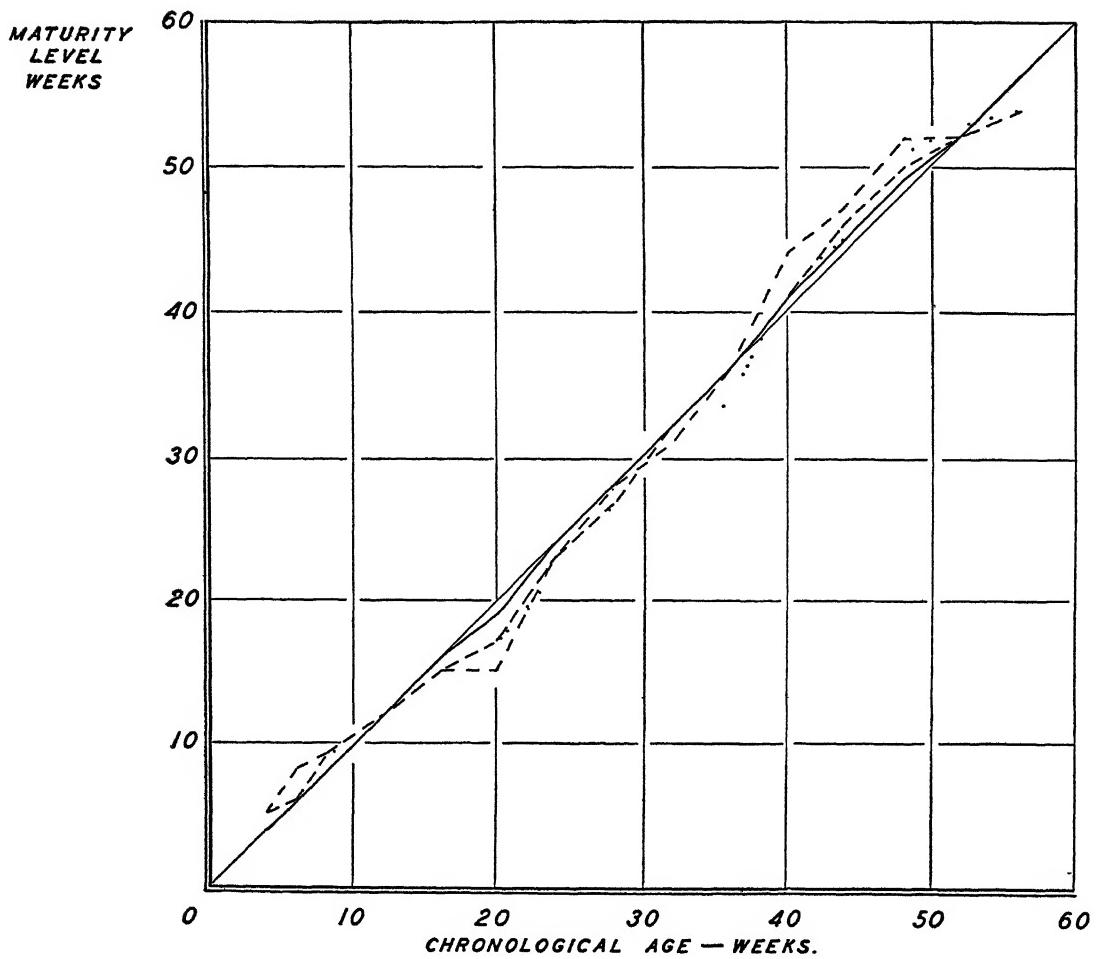
- ANALYTIC DEVELOPMENTAL SCHEDULE.
- ABBREVIATED DEVELOPMENTAL SCHEDULE
- DEVELOPMENTAL SCHEDULE SCORED BY WEIGHTING.
- EXAMINERS ESTIMATE.

FIGURE 23

PREHENSORY BEHAVIOR.COMPARATIVE GRAPH SHOWING DETERMINATIONS OF Maturity Levels By DIFFERENT METHODS

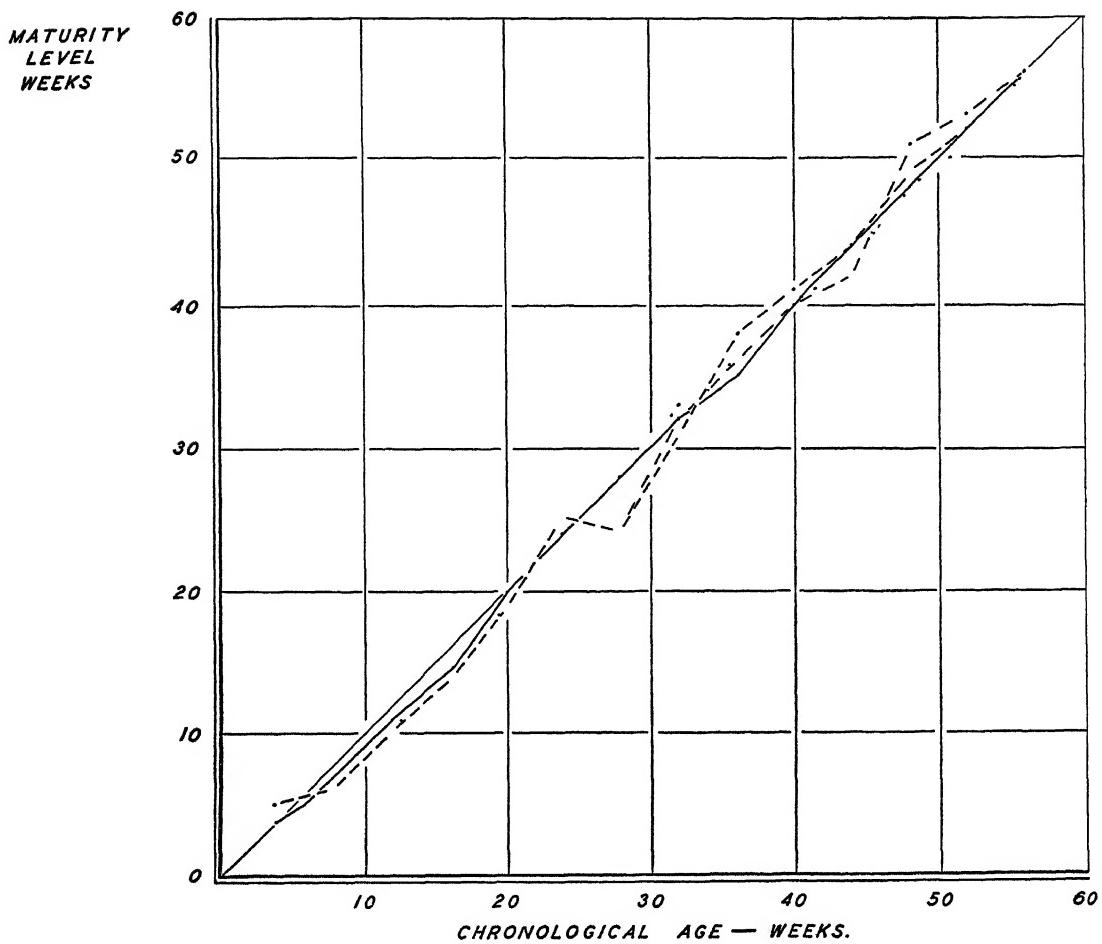
- ANALYTIC DEVELOPMENTAL SCHEDULE
- - - - ABBREVIATED DEVELOPMENTAL SCHEDULE
- DEVELOPMENTAL SCHEDULE SCORED BY WEIGHTING EXAMINERS ESTIMATE

FIGURE 24

PERCEPTUAL BEHAVIORCOMPARATIVE GRAPH SHOWING DETERMINATIONS OF MATURITY LEVELS BY DIFFERENT METHODS.

- ANALYTIC DEVELOPMENTAL SCHEDULE
- - - - ABBREVIATED DEVELOPMENTAL SCHEDULE
- DEVELOPMENTAL SCHEDULE SCORED BY WEIGHTING EXAMINERS ESTIMATE
- EXAMINERS ESTIMATE

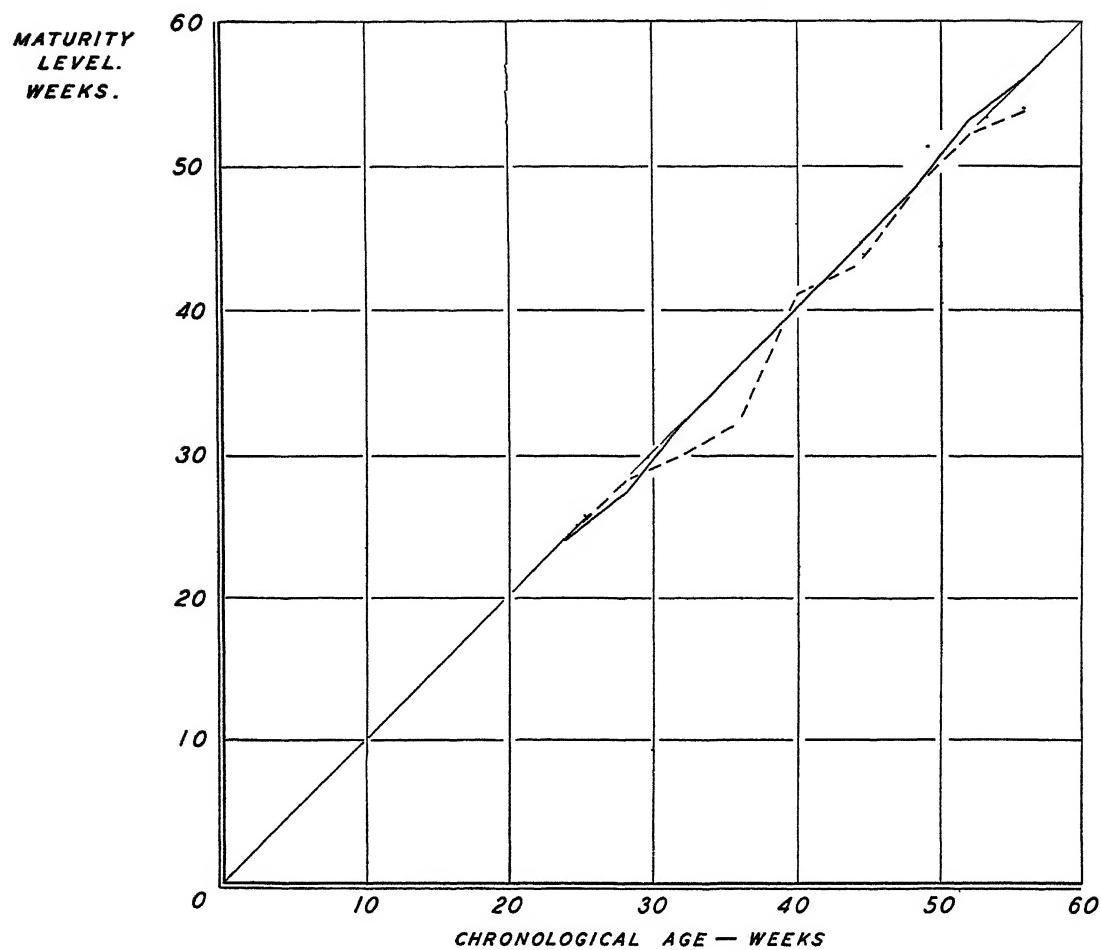
FIGURE 25

ADAPTIVE BEHAVIOR.

COMPARATIVE GRAPH SHOWING DETERMINATIONS OF
MATURITY LEVELS BY DIFFERENT METHODS

- ANALYTIC DEVELOPMENTAL SCHEDULE
- ABBREVIATED DEVELOPMENTAL SCHEDULE
- ... DEVELOPMENTAL SCHEDULE SCORED BY WEIGHTING EXAMINERS ESTIMATE

FIGURE 26

LANGUAGE-SOCIAL BEHAVIORCOMPARATIVE GRAPH SHOWING DETERMINATIONS OF
MATURITY LEVELS BY DIFFERENT METHODS

----- ANALYTIC DEVELOPMENTAL SCHEDULE

.... . . . DEVELOPMENTAL SCHEDULE SCORED BY WEIGHTING
———— EXAMINERS ESTIMATE

FIGURE 27

the general trend of the item but they also specify the trend in greater detail. Compare the two items:

Age level in weeks:	20	24	28	32	36	40	44
Si 32 Erects self from leaning forward	6	18	36	40	80	94	100
Si 18 Sits for ten minutes (approximately)	0	0	0	21	57	80	97

On the Analytic Developmental Schedule these items are placed at the same age and are treated as being equally important in evaluating 36 weeks old behavior. It is obvious, however, that Si 32 appears earlier and is thus more immature behavior and develops more slowly than Si 18.

In order to incorporate this information in a scoring scheme, score values were assigned to the items proportionate to the percentage values as follows:²

SCORE VALUES

PERCENTAGE	INCREASING ITEMS	DECREASING ITEMS	PERCENTAGE	INCREASING ITEMS	DECREASING ITEMS
93-97	-9	+9	43-47	+1	-1
88-92	-8	+8	38-42	+2	-2
83-87	-7	+7	33-37	+3	-3
78-82	-6	+6	28-32	+4	-4
73-77	-5	+5	23-27	+5	-5
68-72	-4	+4	18-22	+6	-6
63-67	-3	+3	13-17	+7	-7
58-62	-2	+2	8-12	+8	-8
53-57	-1	+1	3-7	+9	-9
48-52	0	0			

FOCAL ITEMS

PERCENTAGE DIFFERENCE	SCORE VALUE*	PERCENTAGE DIFFERENCE	SCORE VALUE*
0-4	0	30-34	±6
5-9	±1	35-39	±7
10-14	±2	40-44	±8
15-19	±3	45-49	±9
20-24	±4	50-54	±10
25-29	±5	55-60	±11

* A plus score is used for the percentages at ages prior to the focal age, a minus score at ages older than the focal age.

Zero was assigned to the fifty percentile since that percentile has been considered as the critical age. For increasing items, behavior occurring at ages younger than the critical age is

² It is natural to evaluate an item in terms of the percentage of children who display that behavior. The inequality of percentile units in the absolute sense has been emphasized by many, but it should be remembered that there is no such thing as absolute equality. A simple example will make this clear. The difference between 2 and 4 is equal to the difference between 6 and 8 in the sense that the same number 2 is added in each case, but the difference between 2 and 4 is also equal to the difference between 6 and 12 in the sense that the same proportion is added in each instance. Absolute equality except as complete identity does not exist even in the abstractions of mathematics. Percentile units are equal with reference to proportions of the population and in that sense their use is justified.

a sign of advanced development, while behavior not developing until after the critical age is a sign of retardation in that particular respect. Consequently, for these increasing items the score values corresponding to percentages lower than fifty have been assigned plus values; and to percentages greater than fifty, minus values. The decreasing items have reversed values: for percentages greater than fifty, the score values are plus; for those less than fifty, minus.

The score values for the focal items are in terms of the difference between the percentage at a given age and the percentage at focus, the value at focus being zero.³ Since focal items which develop before the age of focus indicate advanced behavior growth, the score values are plus at ages prior to focus; and since focal items developing after the focal age denote slower than average growth, they are scored minus at ages older than the focal age.

Thus, for any type of item a plus score indicates that a child is more mature than the score age; and a minus score, that a child is more immature than the score age.

The score values are used in the following way to determine a child's developmental level.

Decreasing items. When a child displays a decreasing behavior item no score is given to ages at which the behavior has been observed in more than 50 per cent of the cases, but the appropriate minus score is given to ages older than this age. Consider for example the following item:

	Age in weeks	6	8	12	16	20	24	28
Si 8 Back uniformly rounded	Percentage	92	91	71	57	13	17	8
	Score value	8	8	4	1	-7	-7	-8

According to the percentages this behavior is to be expected through the age of 16 weeks but after that age it is uncommon. If this particular behavior is observed in a child's behavior pattern, we are justified in saying that his development in this respect may be at the 16 weeks level or at any younger age, but that his development is not up to the 20 weeks level; a negative score is therefore appropriate for ages 20 weeks and older, as an indicator that the child is younger than these ages with respect to this particular behavior. The degree of incompatibility of his behavior with those ages is indicated by the deviation of the percentages from the fifty percentile as shown by the score value.

However, if a child's back is *not* uniformly rounded, his posture is more mature than at the 16 weeks level. To indicate this fact a plus score is appropriate at 16 weeks and younger. No score is given to the ages above 16 weeks because this item does not indicate how much older he might be. Other items relating to back posture will give further indication of his developmental age.

Increasing items. These items are scored similarly to the scoring of decreasing items. If a child displays an increasing item, the plus values for the ages prior to the critical age are used; no score is given to older ages. If a child fails to exhibit an increasing item, no score is given to

³ For the few focal items whose percentages at focus exceed 50 per cent, the score value is determined by the deviation from the fifty percentile. This procedure corresponds to that for increasing and decreasing items.

ages younger than the critical age while the appropriate minus score is given to the older age. For instance, consider the following score values for St 40 *Stands independently*.

	Age in weeks	40	44	48	52	56
St 40 Stands independently	Percentage	9	10	22	33	68
	Score value	8	8	6	3	-4

If a child does stand independently he is more mature in this respect than 40, 44, 48 and 52 weeks. Plus scores are appropriate at these ages to indicate this fact; but although we know he is older than 52 weeks, we do not know how much older. No score is therefore given to 56 weeks. On the other hand, if a child does not stand independently, this item would not be significant at the ages 52 weeks and younger, when he would not be expected to stand. At 56 weeks, however, the fact that he did not stand would indicate retardation in motor development, and a minus score would be appropriate.

Focal items. If a child displays a focal item, all score values are used for their appropriate ages; if the child does not display that behavior item, no values are used.

When each item of a child's behavior has been scored for the age range for which score values are available, there remains the problem of deriving a composite score for each age in order to locate the age of zero score or maturity level of the behavior. It must be emphasized that because of the nature of the growth process a composite score cannot be logically justified. In final analysis, we must resort to clinical insight. However, as a point of departure for interpretive analysis, we may use the simplest combination of score values, or one which gives equal weight to the scores of each item. The total score for each age will give an indication of the deviation of the child's maturity level from that age norm. By locating the age of zero deviation, the maturity level may be found.

APPENDIX B

BIBLIOGRAPHY OF YALE FILMS OF CHILD DEVELOPMENT

THROUGH a co-operative arrangement with Yale University, a series of films dealing with the life and growth of the human infant has been published and is distributed by Erpi Picture Consultants, Inc (250 West 57th Street, New York City). The films represent specially edited units derived from the cinema research records in the photographic library of the Yale Clinic of Child Development. The films, listed below, are available in both 16 mm. and 35 mm. sizes and in both silent and sound versions. The sound versions carry a spoken explanatory commentary by Dr. Gesell.

The following descriptive bibliography of the films is based upon abstracts which have appeared in the *Psychological Abstracts*, July, 1935, Vol. 9, No. 7, pp. 389-90.

The Study of Infant Behavior. (2 reels: 2000 feet.)

An inclusive, introductory view of the clinical and research activities of the Yale Clinic of Child Development. Depicts the general course of a normative examination: the arrival of the mother and the infant, the behavior test situations, the physical measurements, and the operation of recording and observation in the photographic dome. The test materials, the examination crib, and infant's chair, and the properties of the one-way-vision screen are demonstrated. Specimens of behavior in reaction to the cubes, pellet, spoon, cup and spoon, form-board, are shown at 16 and at 44 weeks. Ring and string behavior characteristics at 28 weeks, at 36 weeks, and at 44 weeks are compared by the method of coincident projection in which two distinct ages are simultaneously screened. The techniques of cinematography and the cine-manalysis of behavior patterns are outlined.

A second reel portrays the procedures of the service division of the clinic and of the guidance nursery. A series of dissolve-diagrams suggests the rapidity and complexity of mental growth in the first year of life.

The Growth of Infant Behavior: Early Stages. (1 reel: 1000 feet.)

This film deals with the concept of behavior pattern. By comparative devices the early stages of growth patterning are portrayed. The behavior of Boy D at 8 weeks and his behavior at 52 weeks are brought into contrast. The postural responses of Boy E at 12, 16 and 20 weeks are shown in close succession in the pulled-to-sitting and supported-sitting situations. His cube behavior at these same ages is comparatively analyzed by means of slow-motion coincident projection. Animated diagrams are used to illustrate the meaning of the term *behavior pattern*. The reel concludes with a glimpse of cube behavior at one year. "These progressive changes in the patterning of cube behavior give us a true indication of how the mind of the infant matures."

The Growth of Infant Behavior: Later Stages. (1 reel: 1000 feet.)

An introductory animated diagram depicts the growth of the foetal hand. The neonatal hand is pictured. The film then continues a portrayal of further stages in the patterning of cube behavior at 24, 28, 40, and 52 weeks. The method of coincident projection is used to define the developmental differentiations in visual regard, grasp, manipulation, and exploitation.

The behavior at 24 and at 28 weeks is dissected into stilled pattern phases. The behavior at 40 weeks is portrayed in detail to delineate the pre-eminence of the index finger in the patterns of manual behavior. A concluding summary suggests further stages of growth up to 5 years of age.

Posture and Locomotion. (1 reel: 1000 feet.)

Delineates typical postural behavior in one infant, Boy D, at 13 successive age levels; namely 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, and 80 weeks. Advance in prone posture is shown at 8, 12, 16, and 20 weeks; stepping movements in the supported standing position, rolling, the preliminary creep attitude, pivoting, and rudimentary creeping at later ages. Cruising and well-defined quadrupedal locomotion are shown at 40 weeks. Combinations of prehensory, exploitive, and postural behavior at 44 weeks. Standing, equilibrium, and early walking at 48 and 52 weeks; running at 80 weeks. A series of rapid dissolves summarizes the ontogenetic sequence, and gives a concentrated unifying view of the trends of behavior patterning through thirteen consecutive stages.

From Creeping to Walking (1 reel: 1000 feet.)

This film is supplementary to that on *Posture and Locomotion*. It delineates in naturalistic situations the later stages of prone and upright progression in an infant girl (Girl B) at 7 age levels: namely 36, 40, 44, 48, 52, 68, and 80 weeks. Flash backs are used to make comparisons with the developmental stages of locomotion in Boy D. Temperamental as well as motor differences are made apparent. Forty-eight weeks behavior is depicted in detail to show associated patterns of kneeling, standing, lowering, cruising, rolling, creeping, pivoting, and assisted walking. "Growth is a process of progressive organization in which patterns of behavior are constantly correlated and combined as you see them here." Advanced walking and stair climbing are shown at 68 and 80 weeks.

A Baby's Day at 12 weeks. (1 reel: 1000 feet.)

This film is designed to give a compressed summary of a day's cycle of behavior at the age of twelve weeks. With the aid of an animated clock dial the routine of the infant's domestic day is pictured. The following situations are shown in sequence: sleeping, yawning, stretching, waking, breast feeding, nap, undressing, bath, sunning, dressing, bottle feeding, sleep, feeding, play, outdoor nap, floor play, feeding, sleep, and night nursing. The psychological and hygienic implications of the child-care situations are indicated in the spoken commentary. The record of the behavior day of this infant (Boy A) at 12 weeks furnishes a basis for comparisons at later age levels.

A Thirty-six Weeks Behavior Day. (1 reel: 1000 feet.)

The infant (Boy A) whose behavior day at 12 weeks was charted in the previous reel, is now 36 weeks old. He has made striking progress in the interval. Changes in his behavior are apparent in his bath behavior, feeding, and play. A long continuous sequence of play with a water toy reveals marked persistence of attention. The portrayal of the infant's spontaneous play activities includes a unique record of his very first successful creeping. At one meal his mother feeds him; at another his father. Differences in the infant's responses to these feedings are made evident. The social aspects of his behavior receive incidental comment in the narration.

A Behavior Day at Forty-eight Weeks. (1 reel: 1000 feet.)

The effects of increasing maturity on the cycle of daily behavior are delineated in an infant girl (Girl B). The behavior in the bath reveals matured patterns of play. A prolonged episode of repetitive and exploitive play with a water toy demonstrates characteristics of learning and of experimentation. The feeding situations show developing capacities of self-help.

The narration places emphasis on the psychological import and the educational significance of the infant's everyday experience. These films, which chart specimen behavior days at advancing age levels, serve to reveal persisting traits of individuality as well as developmental progressions. The films also indicate the psychological aspects of child care.

Behavior at One Year. (1 reel: 1000 feet.)

The characteristic behavior patterns of a normative one-year-old infant (Girl B) are demonstrated by means of standardized developmental tests. Continuous-run records show the full sequence of reactions in the following situations: consecutive cubes, massed cubes, cup and spoon, cup and cubes, pellet, pellet and bottle, bell, ring and string, ring-string and bell, paper and crayon, performance box, and formboard. Fundamental modalities of response and distinctive dynamic characteristics appear repeatedly and consistently in the flow of behavior. The significance of maturity level and of individuality is cumulatively conveyed.

Learning and Growth. (1 reel: 1000 feet.)

The relationships between maturity and learning are delineated in a comparative manner at varied age levels. Naturalistic and normative test situations are used to set forth the possibilities and more particularly the limitations of training. Responses to nursery game "teaching" are shown at 28 weeks (Boy B), 32 weeks (Girl A), 36 weeks and 40 weeks (Girl B), and 48 weeks (Boy A and Girl B). The influences of goal, lure, imitation and demonstration are shown in postural and problem solving situations (Boy B, 40 weeks). The solution of a ring and string problem on the floor is depicted in detail in this same infant at advancing stages of postural maturity at 36, 40, and 48 weeks. The comment deals especially with the factors of maturation.

Early Social Behavior. (1 reel: 1000 feet.)

Ten different children from 8 weeks to 7 years of age are depicted in a variety of social situations. These situations include response to social approach in infants at 8, 12, and 16 weeks. Emotional characteristics of Boy D are pictured at length at advancing age levels from 20 weeks to one year. A long sequence renders interesting "social" reactions to his mirror image. Six infants are shown in comparative series to emphasize individual differences. Household situations are portrayed to exhibit social interactions between infant and adult and toward older brothers and sisters. The developmental as well as conditioning aspects of early social behavior are suggested in the comment.

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A special series of films has been prepared in 16 mm. silent version to illustrate the developmental sequence in 25 behavior situations delineated in *An Atlas of Infant Behavior*. An additional film illustrating the examination procedures in the normative situations is in preparation. Other subjects in preparation include a series of films on the feeding behavior of infants, a film on prone progression, and another on thumb opposition.

Special films depicting atypical behavior development are available as follows: *A Behavior Study of Motor Disability from Cerebral Birth Injury* (Gesell, A. and Zimmerman, H. Correlations of Behavior and Neuropathology in a Case of Cerebral Palsy from Birth Injury. American Journal of Psychiatry, 1938). *The Effect of Thyroid Therapy on the Mental and Physical Growth of Cretinous Infants.* (Gesell, A., Amatruda, C. S., Culotta, C. S. American Journal of Diseases of Children, Vol. 52, pp. 1117-1138.)

APPENDIX C

ROUTE SCHEDULE FOR CLINICAL EXAMINATIONS

THE subjoined diagram indicates graphically the sequence and scope of the behavior situations as used in the standard clinical examination.

ROUTE SCHEDULE FOR CLINICAL EXAMINATIONS

READ ACROSS TO ASCERTAIN THE AGES AT WHICH A GIVEN SITUATION WAS USED
READ DOWN FROM THE TOP OF ANY GIVEN AGE COLUMN TO ASCERTAIN THE
SEQUENCE OF SITUATIONS AT THAT AGE

FIGURE 28

TABLE 25
INCLUSIVE ROUTE SCHEDULE OF BEHAVIOR SITUATIONS

The following table lists all the situations for which normative data are available. Those situations which were not included in the Analytic Developmental Schedule but which may be used for supplementary observation are indicated by an asterisk.

SITUATIONS IN THE ORDER OF OBSERVATION	AGE RANGES (INCLUSIVE) AT WHICH SITUATION WAS GIVEN
Supine	4-40 weeks
Rattle	4-28 weeks
Dangling Ring	4-28 weeks
Bell Ringing	4-24 weeks
Pulled-to-Sitting	4-28 weeks
Sitting	4-56 weeks
Chair	12-40 weeks
*Table Top	12-56 weeks
One Cube (First)	12-56 weeks
Consecutive Cubes	12-56 weeks
*Massed Cubes	16-56 weeks
*Tower Building	40-56 weeks
*Spoon	16-36 weeks
*Cup	12-36 weeks
*Cup and Cubes	32-56 weeks
*Cup and Spoon	32-56 weeks
Pellet	12-56 weeks
Pellet and Bottle	32-56 weeks
Bell	28-56 weeks
Ring and String	28-56 weeks
*Ring, String and Bell	32-56 weeks
*Paper and Crayon	36-56 weeks
*Formboard	20-56 weeks
Performance Box	40-56 weeks
*Cup-Shoe-Box	48-56 weeks
Ball	40-56 weeks
Give it to me	40-56 weeks
*Mirror	40-56 weeks
Standing	4-56 weeks
Prone	4-56 weeks
Posture and Locomotion	32-56 weeks
Staircase	40-56 weeks

APPENDIX D

CLINICAL AND RESEARCH RECORD FORMS

FOR convenience of reference this Appendix assembles various forms used for clinical and research records. As already indicated in Chapter XIII, these forms are flexible and may be adapted to varying degrees of emphasis and detail. Those forms which are considered essential for diagnostic purposes are designated by an asterisk.

With brief comment and practical suggestions the forms are discussed in the following order:

- * 1a. Introductory Report
- 1b. Medical Report
- * 2. Supplementary Behavior Interview
- * 3. Observation Record of Behavior
- * 4. Analytic Developmental Schedule
- 5. Analytic Scoring Sheet
- 6. Record of Behavior Individuality
- 7. Anthropometric Record
- * 8. Summary Face Sheet
- 9. Follow-up Report
- 10. File Folder

1a. *Introductory Report.* This report carries basic introductory information concerning the family, the birth, health, and developmental history of the infant to be examined. The form may be filled out by a representative of a social agency, or by the parent or by a referring physician. In spite of its apparent simplicity the report needs careful attention. Errors and omissions with respect to names and birth date readily occur. The birth date may assume considerable importance and should be verified whenever possible. It is often helpful to know the name of the hospital where the child was born, so that the physician in charge may supply details concerning the birth history when it cannot be accurately secured from parent or social worker.

This introductory form carries a section for stating the reasons why the infant is referred for examination. If the child presents a developmental or behavior problem, it is desirable to have a brief written statement of the problem. The very manner in which the problem is formulated by parent or social worker often proves revealing.

Depending upon the circumstances, the form may be sent in advance as an aid in defining an appointment. In any event, the report should be in the examiner's hands prior to the examination. The report gives convenient initial orientation.

It is often desirable to check up on the accuracy of that part of the report which deals with the developmental history. Such a check-up will serve to make both parent and social worker conscious of the importance of the developmental items on which information is requested. This review of the developmental history also makes a natural transition to the preliminary behavior interview.

1b. *Medical Report.* When a clinic does not undertake a physical examination of the child, a medical report may be secured from the family physician or elsewhere. In certain problem situations such a report is an indispensable part of the diagnostic investigation. The medical examination record form shown on page 250 suggests a simple method for summarizing more elaborate and detailed medical findings. The medical data concerning sensory, nutritional, endocrine, and neurological factors are particularly important to consider in the behavior study of developmental conditions.

2. *Supplementary Behavior Interview.* The behavior interview represents an important subdivision of the total diagnostic survey. It may be used to supplement the information supplied on the Introductory Report form, but its chief value lies in the opportunity which it affords for securing a more intimate familiarity with the daily routine and home life of the infant.

When the Introductory Report form has not supplied adequate data in regard to birth, useful facts may sometimes be secured from the parent. In connection with the interview, it is also possible to secure significant information concerning physical peculiarities, susceptibilities, and personality traits of mother and father. These may be noted under the heading *Special characteristics*, when they have some potential bearing on the interpretation of the infant's behavior. For similar reasons it is often desirable to secure a restatement of the problem which brings the infant to the clinic. This restatement may be rendered verbatim in the record as a reflection of the mother's attitude and an estimate of her problem. Under the item *Race* available facts concerning the racial strain and nationality of parents and grandparents should be included.

The record of the infant's *Behavior Day* is of considerable importance. With practice and planning, the examiner may develop special skill in securing an informative recital from the mother. Of course the interview must be kept in bounds. It should center upon an outline of the important child-care events in the daily routine. It would be useless to define a standard procedure, because variations must always be made to suit the informant. Incidentally, through the interview, valuable data concerning the child's appetite, habits, play activities, and emotional behavior can be secured. The number of hours awake, the longest period awake, the number of sleeping periods, and the longest sleeping period may be computed at the examiner's convenience. When the hours have been calculated in this manner, they may be compared to the normative data relating to sleep and activity. This information and other information gathered in connection with the interview may prove to be of practical importance in defining recommendations for the guidance of the parent and the social agency. Reminders of such recommendations may be jotted in the section *Comment* as they naturally occur to the examiner during the course of the interview. Other details concerning the conduct of the Behavior Day Interview may be found in Chapter II, which indicates the interview method used in gathering the normative data.

If the mother has difficulty in responding to general questions concerning the clock hours and events of the day, she may be asked to reconstruct from memory the actual behavior events of the infant's yesterday. When the chronicle of a representative day has been completed, it will still be necessary to secure a concrete record of the behavior characteristics and capacities of the child with respect to the following fields of behavior: motor, language, play, social, feeding and individual traits, and habit training. Here again the examiner must exercise economy and selective skill in securing significant and objective facts. The information may

be entered in appropriate spaces on a blank form or may be more informally recorded under general headings.

3. *Observation Record.* The form for recording the behavior of the infant during the normative examination has designedly been made simple. The form consists essentially of two columns, one for a designation of the situation and the second for a running account of the reactions of the infant. It would be undesirable, if not impossible, to limit the record to plus and minus entries indicating success and failure. The purpose of the form is to provide a running account of the sequence and flow of behavior. A complete account is feasible only with stenographic assistance. However, after experience and self-training, it is possible for the examiner to make immediate notations of the responses. Brief notations and hints can be amplified later, for recording in partial outline the actual course of the original behavior.

It will not be necessary to keep the record on one uniform level of detail. For example, if the child shows highly characteristic or significant behavior in some one situation (say, the pellet and bottle situation), it will be desirable to give an especially detailed report of the reactions in this particular situation, contenting oneself with a slighter record of the other situations. One situation reported in detail in this way will prove valuable in conjuring up a vivid, concrete image of the general behavior picture and of the child's distinctive dynamic traits. In fact, a paragraph of such narrative may depict the individuality of an infant more effectively than an equal amount of description.

In making notations, the examiner will naturally bear in mind those items or aspects of behavior which must be later identified in analyzing the behavior status. If the examiner is not conversant with the behavior items represented in the normative schedule, he should consult a list of these items in connection with the examination.

4. *Analytic Developmental Schedule.* The construction and utilization of this schedule have been discussed at length in Chapter XII. It will be noted that the schedule as here reproduced is planned for a letter size format ($8\frac{1}{2} \times 11$ inches) to facilitate filing. A separate sheet for each behavior field increases the convenience and flexibility of recording and scoring. It will also be noted that each sheet carries for each subdivision three vertical columns for the plus and minus entries. One column serves for a single examination. This arrangement will make it possible to record at least three consecutive examinations on a single form. The juxtaposition of these consecutive records favors easy comparison of consecutive examinations.

The items on the schedule are arranged by lunar month intervals. For each item the precise critical age or maturity value as determined by interpolation is also indicated. The items omitted in the abbreviation of the standard version are designated by a prefixed dot (.).

5. *Analytic Scoring Sheet.* This form likewise has been amply described in Chapter XII. It provides the most compact and discriminating recapitulation of the results of the behavior examination. This sheet specifies not only the central-trend maturity age, but it indicates the deviations from this age. In practice this sheet serves as a preliminary summary and may be made the basis for extended interpretive characterization in connection with the summary face sheet (9) or with statement of findings and recommendations communicated by letter to the referring social agency.

6. *Record of Behavior Individuality.* The purpose of this record is to furnish a picture of the dynamic traits of energy, mood, emotion, and sociability which distinguish the infant's

behavior and give it individuality. There is no simple device for recording or identifying these traits. They must be arrived at through interview, but the examiner should also capitalize the normative examination to make observations of dynamic personality traits. The very fact that this examination occurs under conditions relatively controlled and uniform from child to child gives the examiner an opportunity to note individual differences in general adjustment; in the reactions to failure, success and difficulty; in the prevailing mood; in experimental behavior; in perseverance; in stability of attention; etc. These reactions, if interpreted with due clinical caution, furnish an objective basis for a notation of traits of behavior individuality. Indeed, on occasion the examiner may even prolong or adapt some portion of the examination to elicit characteristic reactions for the record.

Pertinent data must also be secured through questions about the child's everyday life, his play, his habituations, and the parent-child relationship. It is especially important to inquire into the emotional reactions to the daily routines, including his adjustments to feeding, sleep, and elimination.

The record form carries 8 behavior categories which may be used in a flexible manner for developing a somewhat systematic record of significant individuality traits as revealed by his life at home. It is assumed that the examiner will use the items under these headings in a tactful manner to explore a very extensive field. It would be possible to make a list of key questions appropriate to these various categories, but even such questions would have to vary from age to age and would need constant reformulation to adapt them to the intelligence of the informants. For this reason the examiner is obliged to rely on his clinical skill, using the outline simply as a point of departure for developing questions suited to each particular case. Abbreviated notations may be made during the interview. Here, as elsewhere, the method must be selective, and directed toward the goal which is a summarizing characterization.

7. *Anthropometric Record.* The procedures for securing the physical measurements have been sufficiently detailed in Chapter VI. The measurements should be so managed that they will not unduly interfere with the behavior observations. The child's reactions to the process of measuring will throw incidental light on his behavior characteristics. The physical measurements become most useful when they are made periodically in relation to a series of examinations. The sample form illustrates the method of recording a single examination and a series of examinations.

Indices and derived measures will naturally be computed in connection with the detailed analysis of the examination data. Any observed physical deviations, however, should be recorded immediately in the course of the examination under *Comment, concerning appearance and type.* Certain deviations, including asymmetries, may require two or more separate measurements to define them. Identification marks or peculiarities should go into the record. The anthropometric summary may formulate a critical, comparative statement concerning body type, deviations, growth increments, etc.

8. *Summary Face Sheet.* The face sheet carries for summary purposes a brief indication of characteristic or maximum behavior, concretely expressed in relation to specific test situations in various behavior fields. This record also formalizes the diagnostic classification and calls attention to complications or deviations which should be noted at subsequent examinations. The comparative possibilities of the follow-up examinations are greatly enhanced if each face sheet carries a paragraphic characterization of the child. It is not necessary for this characterization to be inclusive and balanced. It may be formulated as a thumb-

nail sketch designed to recall vividly the distinctive characteristics of the child under examination.

The summary face sheet assumes added importance if the child is examined at repeated intervals. The infant presently becomes of nursery school, kindergarten, and elementary school age. The developmental diagnosis of behavior in infancy should be kept in close continuity with the psychological examinations made at later ages. The summary face sheet is, therefore, planned to be equally serviceable for older children. A developmental biogram is incorporated in the face sheet and designed to give a compact graphic summary of the findings at any age. The biogram provides for determinations of maturity level in both behavior and physical measurements. The blank spaces may be used to graph specially selected aspects or fields of behavior. In drawing up the biogram, the recorder assigns appropriate age values to the vertical lines of the grid. By recognizing the continuity of the child's developmental career, the analysis of the infant's behavior growth may be brought into more vital relationships with the clinical diagnoses at the more advanced ages.

The face sheet embodies a brief statement of the recommendations made. These recommendations should be checked up on subsequent examinations, and should take due account of the original reasons which brought the child to the clinic. The advice given should be concretely summarized so that the status of the recommendations and the course of the child's adjustment can be more intelligently and closely followed.

9. *Follow-up Report.* As a further check upon the recommendations and the developmental career of the child, it is advisable to call for follow-up reports. These can be secured through correspondence or they may come through interviews with the parents and social workers. The Follow-up Report takes the place of an Introductory Report prior to a re-examination. Re-examinations may be made either at the request of the responsible social agency, of the parent, or on the suggestion of the clinic.

10. *File Folder.* The file folder may be used to inventory a series of follow-up examinations. It provides a convenient over-view of the clinical contacts of any case which is receiving repeated attention.

We have found it convenient and an aid to ready reference to distinguish the foregoing forms by differential colors as follows: Form 1a, russet; 1b, white; 2, blue; 3, primrose; 4, café; 5, white; 6, goldenrod; 7, buff; 8, gray; 9, russet; 10, gray.

INTRODUCTORY REPORT by Social Agency

The Clinic of Child Development, 14 Davenport Ave., New Haven, Conn.

Name: Age: yrs. wks. No.
 (please print)

Name of Agency: Date of admission
 Social Worker: or of supervision:

Agencies interested:

Reason:

Probable or proposed disposition:

BIRTH HISTORY. Date: Verified? Place (hospital):

Weight: Term: premature wks.; postmature wks.; full

Complications during pregnancy:

Delivery (normal, precipitate, difficult, instrumental, version, etc.) Physician:

Condition at birth (cried immediately, cyanotic, resuscitated, etc.):

Condition during first month (feeding difficulties, convulsions, crying, etc.):

HEALTH HISTORY: (Hospital record No.)

(Date of last physical examination, summary of examination. List illnesses with dates.)

DEVELOPMENTAL HISTORY:

Sat unsupported at mo. Walked alone at mo. Began to name objects (ball, etc.) at mo. Trained to toilet at mo. Held own cup at mo. Fed self with spoon at mo.

Further details:

FAMILY HISTORY: Address:

Name	Birth date	Nat'l	Occupation	Education
------	------------	-------	------------	-----------

Father

Mother

Siblings

School grade

Development

(Continued on next page)

Note any exceptional or significant facts in regard to home conditions, parents, or relatives:

Has child been in foster home? In an institution? (Give details, including names and dates.)

SOCIAL HISTORY:

(Home and foster home conditions, treatment of child, opportunities for play with other children same age, etc.)

Report on Child's Behavior (by mother or foster mother): (Include her description of child's outstanding personality traits, any problems presented with regard to feeding, sleep, play etc.)

REASON FOR REFERRING TO CLINIC:

Submitted by.....

Date.....

MEDICAL REPORT

In Case of..... Age..... Date..... No.

(1) What is condition of child's

- | | |
|-----------------------|-------------------------|
| (a) Skin | Hair |
| (b) Eyes | Vision |
| (c) Ears | Hearing |
| (d) Teeth | |
| (e) Nose | |
| (f) Tonsils..... | Glands { cervical |
| | axillary |
| | epitrochlear |
| | inguinal |
| (g) Thyroid | |
| (h) Heart | |
| (i) Lungs..... | |
| (j) Abdomen | |
| (k) Genitals | |
| (l) Extremities | |
| (m) Reflexes | |
| (n) Posture | |
| (o) Nutrition..... | |

(2) Tests

- | | |
|----------------------|----------------------------------|
| (a) Wassermann | (e) Vaginal smear..... |
| (b) Tuberculin | (f) Nose and throat culture..... |
| (c) Schick | |
| (d) Urinalysis | (g) Vaccination..... |

(3) Disease history (specify)

(4) Does child need immediate medical or surgical attention for any reason? (Specify)

(5) Does child show any evidence of physical defect, disorder, or disease? (Include any deformities or disfigurements)

(6) Remarks:

Examining Physician

Clinic

Date..... Address.....

SUPPLEMENTARY BEHAVIOR INTERVIEW

Name..... Age..... Date..... No.....

Informant:

Mother: Age Height Weight Race
Health and special characteristics

Father: Age Height Weight Race
Health and special characteristics

Relatives and Siblings (Note any significant deviations, mental or physical)

BIRTH: Weight Place Physician
Term Labor

Post-birth behavior and vigor

Early feeding behavior

Motor development (include handedness and manner of manipulation of objects)

Language (include gestures)

Play interests (include toys)

Habits (self-help in feeding, dressing, toilet)

Emotions (personal attachments, fears, general sensitivity)

Parental factors (including statement of problem)

(Continued on next page)

BEHAVIOR DAY OF Age Date No.

Informant:

Computation	Time	Event	Details and notes on appetite, habits, play, rest

Hours awake:
Longest period awake:No. of sleeping periods:
Longest period asleep:

COMMENT:

OBSERVATION RECORD OF BEHAVIOR

Name..... Age..... Date..... No.....

Exam. place..... Began..... Ended..... Observ-
ers..... Exam-
iner.....

Pre-examination behavior and adjustments:

Situation	Behavior

POSTURAL BEHAVIOR

Name:

Date:

Age:

wk	I - INCREASING ITEMS		D - Decreasing Items		F - Focal Items	
4			St 11 Legs flexed, do not extend	45		
6	Pr 1 Lfts head to Zone 2 (neutral suspension) Head compensates per 6	45 55 55	Pr 2 (Placement) Head rotates St 1 Head sags St 4 Head sags erect only momentarily St 16 Supports no weight	65 65 7		
8	Pr 5 Holds head lifted sustainedly • •	75	St 1 Head sags St 43 Legs extend only briefly St 51 Legs flexed, lift & lowers St 22 One arm extended	9 10 11	St 3 Head bobbingly erect	6-12
12	St 8 Head set forward or erect Su 12 Arms symmetrical Fr 8 Lfts head to Zone 3	9 11 14	St 8 Back uniformly rounded Su 9 Arms prominently in t n r position St 1 Head predominantly rotated Fr 18 Hips raised	13 14 14	Pr 26 Rests only on knees, abd , chest, forearm Su 69 Progresses headward (r) Fr 19 Legs flexed, outwardly rotated	8-12 12-16 8-16
16	Su 13 Arms prominently symmetrical Pr 5 Head predominantly in midposition Pr 14 Lfts hand St 5 Head steadily erect	14 16 16	St 14 Head legs	19	St 4 Head set forward Su 34 Hands in contact, arms flexed	8-12 16-20
20	SC 2 Head erect and steady St 51 Rolls to side St 6 Head erect when leans forward • • Pr 13 Arms extended	18 18 20	St 16 Arms flexed St 21 Falls forward	22 23	St 36 Hands engage at distance from chest RL 48 Rolls to side Fr 28 Rests only momentarily on abd. & chest	20 16-24 20,28
24	Pr 24 Rests on hands St 20 Sits unsupported SC 6 Body erect	• • 23 25	SC 4 Body slumps to side St 42 Legs flexed, outwardly rotated St 39 Legs predominantly flexed	26 27 28	St 57 Arches back Su 58 Bounces hips St 15 Sits only momentarily leaning forward Pr 33 Rolls to side or supine	24 24 24 24,36
28	Pr 9 Lfts head to Zone 4 St 11 Body erect St 20 Supports larger frac of wt more than mount St 13 Assists Examiner by pulling self forward	27 27 27 28	Pr 11 Arms flexed •	30	St 12 Body erect moment or less than minute St 28 Sits leaning forward St 35 Bounces	28 24-32 28
32	St 21 Supports entire weight • • St 17 Sits one minute or more Pr 33 Pivots	30 31 31	St 24 Leans forward passively • • •	33	St 23 Falls backward St 38 Pulls foot to mouth (r)	32 28-32
36	St 32 Erects self from leaning forward St 33 Body erect one minute or more St 18 Sits for ten minutes or more Su 62 Rolls to prone, or sits sans sit with sl assist	33 34 35 36	St 20 Falls	37	Pr 30 Rests only on thighs, lower abd , hands St 27 Sits unsteadily St 27 Stands on toes St 15 Legs flexed, legs held extended	28-44 24-36 36 32-40
40	St 19 Sits for indefinite period St 33 Turns to side and maintains balance Su 63 Rolls to prone or sits sans sitting Pr 37 Flexes leg drawing up knee	37 38 38 39			St 37 (Hand supported) Balance inadequate Pr 39 Regresses	40-44 40
44	Pr 31 Assumes creeping position Pr 44 Pushes upward and backward to sitting Pr 40 Progresses St 33 Lfts foot, while supporting entire weight	41 43 43 44			Pr 32 Assumes quadrupedal position • •	44
48	St 46 Cruises or walks using support St 38 Folds to standing St 46 Lowers self using support	45 45 • • 46			CC 55 Pivots P-Bo 38 Turns to side, pivots or creeps St 48 Walks only when both hands supported	48 48 48
52	St 47 Walks using support • •	49			R-S 36 Turns or pivots St 23 Feet apart four inches or more	52 52
66	St 40 Stands independently (without support) St 41 Atkins standing independently (r) St 4 Surrounds fourth floor	54 56 56				

PREHENSORY BEHAVIOR

Name:

Date:

Age:

wk	I — Increasing Items		D — Decreasing Items		F — Focal Items	
4						
6	Ra 21 (In hand) Holds actively	5				
8	Ra 19 (Contact) Hand opens immediately	7.5	Ra 16 (Contact) Hand clenches	8		
			Ra 17 (Contact) Arm becomes active	10		
			Ra 46 Drops immediately	10		
12	per 4 Pulls at dress	11	Su 28 Hand predominantly closed	13		
	Su 29 Hand predominantly open	12	Ra 22 (In hand) Holds passively	14		
16	RD 23 Approaches	16	RD 24 Approaches after delay	18		
	Ra 40 Brings free hand toward midplane	16	Su 27 Hand predominantly closed	18		
20	Su 30 Hands predominantly open	18	CC 35 Drops immediately	18		
	RD 34 Grasps rattle, near hand	19	RD 43 Drops	23		
	Ra 20 Grasps rattle, near hand	19	RD 35 (If grasps) grasps after delay	24		
24	CC 25 Grasps	22	Ra 45 Drops	25		
	Ra 32 Grasps	22	CC 27 Drops first as second is presented	26		
	Ra 26 Approaches promptly	24	P 17 Fingers table top near pellet	26		
28	CC 21 Grasps with thumb opposing fingers	25	Ra 46 Grasps after delay	24		
	Ra 28 Approaches with one hand	26	Ra 22 Free hand fingers rattle	24		
	P 25 Hand flexes on pellet	27	P 17 Fingers table top near pellet	24		
	CC 20 Holds one cube, grasps another	28	CC 24 Dialogues on contact	28		
32	CC 8 Approaches with one hand	29	CC 11 Reaches for cube beyond reach	28		
	P 37 Grasps pellet	31	CC 6 Dives two cubes as third is presented	28		
36	P 42 Grasps, thumb participates	34	P 21 Places hand over pellet	28		
	P 30 Thumb and index finger meet	34	P 51 (If drops) drops immediately	33		
			P 29 Flexes finger on or near pellet, thumb, fing op	32		
			R-S 12 Hand closes on string ineffectively	32		
40	R-S 14 Grasps strong immediately	39	P 31 Flexes fingers, thumb and index meet	36		
	P 32 Flexes thumb and index finger independent	39				
	P 45 Grasps with index thumb+index finger flexion	40				
44	P 54 Retains pellet	42	CC 9 Approaches with index finger	40		
	G 4 Releases object	44	CC 17 Grasps first, second, third cubes	40		
			P 22 Approaches with index finger extended	40		
48	PFB 8 Pokes in holes	45	B 38 Grasps top of handle	44		
	B 9 Throw or rolls ball	45	CC 36 Casts cube	48		
	P 38 Grasps promptly	46	CC 39 Brings cube to side rail	48		
	HB 17 Inserts rod in hole	48	PB 34 Inverts rod without ever releasing	48		
52	PFB 28 Brings rod to box and releases	50	G 5 Places object in Examiner's hand	48		
	Ba 10 Throws ball	50	G 6 Releases object in Examiner's hand	48, 52		
	P-Bo 29 Holds pellet over bottle	51				
56	PFB 36 Releases rod in hole	54				
	P-Bo 30 Releases pellet over bottle	55				
	Ba 11 Definite repetitive ball play	55				

PERCEPTUAL BEHAVIOR

Name:

Date:

Age:

wk	I - INCREASING ITEMS			D - DECREASING ITEMS			F - FOCAL ITEMS		
	Ra	Rd	Su	Ra	Rd	Su	Ra	Rd	Su
4	Ra 1 Regards rattle	3		Su 64 Stares vacantly		4.5			
				RD 6 Disregards in midplane		4.5			
6	Su 65 Fixates definitely	5		Su 66 Stares at window or wall .		6.5			
	RD 9 Regards in midplane (round head)	5							
so 2	Vincently purruses moving person	. 5.5							
Su 69	Facial expression attentive	5.5							
8				Ra 9 Regards only momentarily		10			
				RD 13 Shifts regards to surroundings		10			
				RD 3 Regards momentarily		11			
12	Ra 5 Regards in midplane (pony or after shaken)	11		Ra 12 Regards surroundings		13			
	RD 4 Regards prolongedly	11		RD 1 Regards after delay		14			
RD 8	Regards in midplane (long head)	12		RD 2 (If re-l. only in line of vis or when shak		14			
				RD 4 (If regards) regards after delay		15			
16	CC ₁ 3 Regards cube	13		CC ₁ 15 Regards hand		18			
	*Ra 8 Regards spontaneously in midplane	14		P 14 Regards Examiner's hand		19			
	RD 47 If drops, responds to loss	15		RD 12 Shifts regard		20			
P 1	Regards (a m.p. on n m p.)	16							
20	Ra 15 Regards rattle in hand	17		Su 67 Regards Examiner		21			
	P 2 Regards with definite fixation	18							
P 3	Regards (confirmed)	18							
24	P 6 Regards immediately	22							
	RD 5 Regards consistently	23							
Ra 11	Regards consistently	23							
28	CC 37 If drops cube, rescues it	26							
	RD 47 (If drops) rescues dropped ring	27							
RD 11	Regards string	27							
32	R-S 9 Approaches string first	29							
	CC 45 If drops, rescues cube from platform	32							
R-S 30	Manipulates str. after contact with rug	32							
36	R-S 17 Regards ring as approaches and pulls string	35		P-Bo 19 Attends to bottle only		38			
40	P-Bo 21 Regards pellet after dropped from bottle	37		PFB 10 Manipulates rod		41			
	B 59 Regards clapper	38		P-Bo 18 Manipulates bottle as before		42			
44	P-Bo 2 Regards pellet in bottle	42		P-Bo 3 Attends predominantly to bottle		45			
	CC 56 Turns to side rail	43		PFB 2 Prior manipulation of box		45			
CC 4	Shifts regard to Examiner	44							
48	PFB 6 Prior manipulation of holes	46							
	P-Bo 20 Percusses disappearance of pellet from bottle	47							
P-Bo 4	Attends predominantly to pellet	47							
52	PFB 40 Activity with middle hole	50							
	PFB 35 Inserts rod in middle hole	52							
56	PFB 15 Bounces rod to middle hole	55							
	P-Bo 25 Commences pellet and bottle	55							

ADAPTIVE BEHAVIOR

Name:

Date:

Age:

wk	I — INCREASING ITEMS	D — DECREASING ITEMS		F — FOCAL ITEMS
		Br 1	Postural activity ceases	
4			3	
6	RD 14 Shifts regard to Examiner's hand RD 15 Shifts regard to Examiner	55		
8	Ra 19 (Contact) hand opens immediately	75		
12	Ra 46 Retains at least briefly	• 10		
16	RD 23 Approaches Ra 23 Arms increase activity	16		
20	Ra 15 Regards rattle in hand Br 5 Turns head Ra 20 Grasps rattle, near hand Ra 41 Free hand contacts rattle	• • • 17 18 19 20		
24	Br 6 Turns head to bell Rs 40 If drops, strays toward lost rattle Rs 26 Approaches promptly	• 21 24		
28	CG 31 Transfers cube D 55 Taurus bell end for end Ra 44 Transfers CC 20 Holds one cube, grasps another	• 27 28		
32	R-S 30 Manipulates string after contact with ring B 70 Waves bell after demonstration R-S 23 Secures ring, using string	31 32		
36	CC 46 Combines two cubes CC 26 Bangs cube on table top B 56 Waves	33 34 36		
40	P-Bo 21 Regards pellet after dropped from bottle CC 10 Appr cube, table top with cube in hand on pre Ranges	37 38 39		
44	P-Bo 22 Pursues pellet Ba 6 Responds B 60 Pokes clapper	• • 42 44		
48	PB 8 Pokes in holes PB 33 Inserts rod in hole PB 17 Inserts rod in hole P-Bo 14 Pokes at pellet	45 47 48 48		
52	P-Bo 17 Apparently adapts manip so pellet drops out P-Bo 20 Holds pellet over bottle PB 41 Evidence of induced behavior	50 51 51	• • •	51
56	P-Bo 30 Releases pellet over top of bottle P-Bo 12 Taurus bottle over PB 38 Releases rod into box	54 56 56	• • •	52

LANGUAGE-SOCIAL BEHAVIOR

Name:

Date:

Age:

wk	I — Increasing Items	D — Decreasing Items			SUPPLEMENTARY ITEMS	
		v 5	No vocalization heard	•	•	35
4						
6	v 7 Vocalizes ah-uh-eh v 1 Faces brightans v 3 Smiles Ra 13 Regards Examiner	• : : .	45 55 55 55			
8						
12	v 8 Coos so 3 Knows mother v 9 Blows bubbles	• . . .	9 10 13			
16	v 4 Laughs so 4 States at strangers	• .	14 15			
20						
24						
28	v 12 Vocalizes ma or mu	• .	29	so 6 Accepts strange	• •	30
32	v 13 Two syll 2nd rep first ma-ma, ba-ba v 11 Vocalizes da	• .	31 32			
36	so 8 Adjusts to words	• .	33			
40				v 18 Says no "word" G 1 Does not respond Ba 2 Repetit Ex. or Ex 8 hand, fur reg delay B 78 Vocalizes [focal item]	• •	40 41 42 40
44	v 19 Says one "word" or more so 10 Adjusts to commands Ba 6 Responds	• .	42 44 44			
48	Ba 9 Throws or rolls ball to Examiner v 16 Makes "g" sound (at end of word)	• .	48 49			
52	v 20 Says two "words" or more v 17 Makes "b" sound	• .	50 62			
56	v 21 Says three "words" or more Ba 11 Definite repetitive ball play	• .	54 55			

ANALYTIC SCORING SHEET

Name: Age: Date:

Reckoning Ages	Items	L	M	Sum		<i>Level</i>
	i					
	d					
	f					
	Total					
	i					
	d					
	f					
	Total					

Reckoning Ages	Items	L	M	Sum		<i>Level</i>
	i					
	d					
	f					
	Total					
	i					
	d					
	f					
	Total					

Reckoning Ages	Items	L	M	Sum		<i>Level</i>
	i					
	d					
	f					
	Total					
	i					
	d					
	f					
	Total					

Reckoning Ages	Items	L	M	Sum		<i>Level</i>
	i					
	d					
	f					
	Total					
	i					
	d					
	f					
	Total					

Reckoning Ages	Items	L	M	Sum		<i>Level</i>
	i					
	d					
	f					
	Total					
	i					
	d					
	f					
	Total					

Reckoning Ages	Items	L	M	Sum		<i>Level</i>
	i					
	d					
	f					
	Total					
	i					
	d					
	f					
	Total					

Reckoning Ages	Items	L	M	Sum		<i>Level</i>
	i					
	d					
	f					
	Total					
	i					
	d					
	f					
	Total					

RECORD OF BEHAVIOR INDIVIDUALITY

Name..... Age..... Date..... No.....

Informant:

Special items for record of personality and emotional characteristics:

1. OUTPUT OF ENERGY — great, always on go, average; underactive; fatiguable
2. GENERAL DEMEANOR (Postural and motor) — tense, relaxed, poised, steady, variable
3. SELF-ASSERTIVENESS
 - Submissive
 - Aggressive
 - Dependent
 - Follower
 - Leader
 - Independent
 - Self-reliant
 - Demands attention
 - Tends to show off
 - Caution
 - Complaining
4. SOCIABILITY (response to adults, older children, younger children, children of same age)
 - Sensitivity
 - Sympathy (affected by others, indifferent)
 - Affection and attachment to family group
 - Jealousy
 - Communicativeness (eagerness)
 - Obedience
 - Reactions to solitude
5. INTELLECTUAL TRAITS
 - Inquisitive
 - Experimental
 - Originality
 - Imitative
 - Decisiveness
 - Sense of humor
6. EMOTIONAL EXPRESSION
 - Reactions to fatigue, hunger, and discomfort
 - Reactions to success
 - Reactions to failure and disappointment
 - Reactions to novelty and surprise
 - Crying behavior
 - Smiling and laughter
 - Speech (volume, flow, inflection)
7. FAVORITE PASTIME OR ACTIVITY
8. SPECIFIC BEHAVIOR DEVIATIONS (thumb sucking; nail biting; enuresis; speech defects; tantrums; faulty habits in feeding, sleep, sex or play behavior)

ANTHROPOMETRIC RECORD

Name..... Age..... Date..... No.....

Time of day:

Last feeding:

Examiner:

Observations	Age Norm	Indices-Measurements Relative to:	Age Norm
Lengths — soles to vertex		Length — soles to vertex	
Suprasternal notch		Head girth	
Pubes		Chest girth	
Acromion		Biacromial diam.	
Radiale		Bicristal diam.	
Stylium		Head height	
Dactylion		Head-body height	
Derived measures:		Body length	
Vertex-suprast.		Span	
Vertex-Pubes		Body length	
Suprast -Pubes		Chest girth	
Acromion-Radiale		Bicristal diam.	
Acromion-Stylium		Biacromial diam.	
Acromion-Dactylion		Pubes height	
Radiale-Stylium		Other indices:	
Diameters:			
Biacromial			
Chest (nipples)			
Bicristal			
Girths			
Head			
Chest (nipples)			
Other measures:			
Head length			
Head breadth			
Span			
Weight			
Teeth			
Hair color			
Eye color			
Skin color			

Complications: relaxed; tense.....; crying.....; active.....; cooperative.....

Comment concerning appearance and type:

SUMMARY:

SUMMARY FACE SHEET

Name..... Birth date No. of visit..... Case No.
 Age..... Date..... Seen by..... Medical No.

Maturity Level-					Maturity Level:				
A. Postural									
B. Prehensory									
C. Perceptual									
D. Adaptive									
E. Lang-Social									
Height									
Weight									

Physical characteristics or deviations:

Special factors or complications:

Laterality:

File items:

Classification

Follow-up:

Maximum (or characteristic) behavior:

- A.
- B.
- C.
- D.
- E.

CHARACTERIZATION AND RECOMMENDATIONS:

FOLLOW-UP REPORT

Yale Clinic of Child Development, 14 Davenport Ave., New Haven, Conn.

Name..... Age..... Date.....

Change in social problem since last report:

Health (include minor illnesses since last report):

Environmental changes (foster homes, hospitalization or institutional care, or change in home conditions or care):

Present adjustment (fears, shyness, dependency, or general emotional and social adjustment):

Present reported habits (eating, sleeping, play, self-help, and general progress):

Further pertinent comment:

Reason for re-examination:

Submitted by.....

Agency

Date

APPENDIX E

NORMATIVE SUMMARIES OF PRESCHOOL DEVELOPMENT

THIS schedule of normative summaries is offered in outline form for convenience of reference and as an aid to the observation and estimate of behavior in children from one to five years of age. The schedule is based upon the "System of Developmental Diagnosis" first presented in *The Mental Growth of the Preschool Child*. This volume is now out of print and a revised handbook of procedures and norms is in preparation. Pending the publication of such a handbook, the procedures formulated in the original volume may be followed.

The present schedule in a provisional way has selected serviceable diagnostic items of behavior and has classified them with respect to the same five behavior fields represented in the Analytic Developmental Schedule for the first year of life. This similarity of arrangement is intended to emphasize the continuity between the early and later age levels. The principles and procedures of genetic analysis set forth in the present volume are applicable to the entire period of infancy and preschool childhood.

We believe that the same methods of analysis and interpretive characterization which infant behavior requires must be used with older children to avoid the dangers of oversimplification. In order to illustrate and to advance this point of view, the summaries of preschool development are herewith presented in a preliminary form for tentative use. The individual items are designated by letters and numbers, corresponding to those used in the syllabus of normative items described in Chapter 7 of *The Mental Growth of the Preschool Child* (Gesell).

1. NORMATIVE SUMMARY FOR FIFTEEN MONTHS LEVEL

Postural Behavior. (a) M26 Walks independently; (b) St42 Attains standing independently.

Manual (Prehensory) Behavior. (a) M40 Scribbles spontaneously; (b) A23 Builds tower of 2 blocks; (c) M36 Throws ball into box; (d) P21 Uses spoon.

Perceptual Behavior. (a) A52 Adapts round block to formboard; (b) A33 Pours pellet from bottle.

Adaptive Behavior. (a) A23 Builds tower of 2 blocks; (b) M35 Takes third cube.

Language Behavior. (a) L11 Says four words; (b) Expressive jargon.

Social Behavior. (a) P30 Asks for things by pointing; (b) P21 Uses spoon; (c) P23-24 Bowel and bladder regulated; (d) Co-operates in dressing.

2. NORMATIVE SUMMARY FOR EIGHTEEN MONTHS LEVEL

Postural Behavior. (a) Runs; (b) Seats self in chair; (c) Climbs stairs; (d) Walks pulling toy.

Manual (Prehensory) Behavior. (a) A23 Builds tower of 3 or more blocks; (b) Turns pages of book; (c) M42 Imitates vertical stroke; (d) P21 Uses spoon with good control.

Perceptual Behavior. (a) Looks at pictures; (b) Points to pictures of car or dog.

Adaptive Behavior. (a) A23 Builds tower of 3 or more blocks; (b) Accepts four or more cubes; (c) A41 Puts cube on cup or plate; (d) M42 Imitates stroke.

Language Behavior. (a) L11 Says five or more words; (b) Conversational jargon; (c) P51 Points to nose, eye, hair.

Social Behavior. (a) P21 Uses spoon with good control; (b) P14 Says "Thank you"; (c) P16 Habitually inhibits forbidden acts; (d) P32 Knows where he wants to go.

3. NORMATIVE SUMMARY FOR TWENTY-ONE MONTHS LEVEL

Postural Behavior. (a) Walks backward (imitatively); (b) Walks up stairs.

Manual (Prehensory) Behavior. (a) A51 Puts square in performance box; (b) P33 Tries to turn door knob; (c) A27 Folds paper once imitatively.

Perceptual Behavior. (a) A24 Differentiates tower and bridge; (b) L12 Names one picture.

Adaptive Behavior. (a) A24 Differentiates tower and bridge; (b) A51 Places square in performance box; (c) A27 Folds paper once imitatively.

Language Behavior. (a) L14 Joins two words; (b) L12 Names one picture; (c) Repeats things said.

Social Behavior. (a) Asks for drink, toilet, or food; (b) P23 Bowel control established, (c) Takes off shoes; (d) Pulls people to show.

4. NORMATIVE SUMMARY FOR TWENTY-FOUR MONTHS LEVEL

Postural Behavior. (a) Kicks a ball; (b) Goes up and down stairs alone; (c) Maintains balance while hurrying.

Manual (Prehensory) Behavior. (a) A23 Builds tower of 6 blocks; (b) Imitates blocks in row (train); (c) M42 Imitates circle.

Perceptual Behavior. (a) A52 Solves formboard in 4 trials; (b) L21 Points to 5 pictures; (c) P44 Likes stories with pictures.

Adaptive Behavior. (a) A41 Places cube in cup, box, plate; (b) Imitates blocks in row for train; (c) A52 Solves formboard in five trials.

Language Behavior. (a) L14 Uses words in combination (sentences); (b) Uses "you" and "me" correctly; (c) L13 Names three of five objects.

Social Behavior. (a) P17 Tells experiences; (b) P15 Shows affection; (c) P45 Plays with mimicry.

5. NORMATIVE SUMMARY FOR THIRTY MONTHS LEVEL

Postural Behavior. (a) Tries to stand on one foot.

Manual (Prehensory) Behavior. (a) A23 Builds tower of 8 blocks; (b) M42 Imitates both horizontal and vertical strokes; (c) M42 Marks twice for cross.

Perceptual Behavior. (a) Places one color form; (b) L21 Points to 8 pictures; (c) A52 Adapts blocks to formboard after initial error; (d) Adds chimney to train.

Adaptive Behavior. (a) A24 Builds bridge; (b) A52 Adapts block to formboard after initial error; (c) M42 Marks twice for cross; (d) A70 Gives "Just one."

Language Behavior. (a) L31 Names 5 pictures; (b) Detroit A — 5 correct; (c) A70 Gives "Just one."

Social Behavior. (a) P53 Gives full name; (b) Helps put things away.

6. NORMATIVE SUMMARY FOR THIRTY-SIX MONTHS LEVEL

Postural Behavior. (a) Alternates feet going upstairs; (b) Stands on one foot.

Manual (Prehensory) Behavior. (a) A23 Builds tower of 8 blocks; (b) M43 Copies circle; (c) M42 Imitates cross.

Perceptual Behavior. (a) Matches 3 color forms; (b) A24 Builds bridge from model.

Adaptive Behavior. (a) A24 Builds bridge from model; (b) Matches 3 color forms; (c) M42 Imitates cross; (d) M43 Copies circle.

Language Behavior. (a) L31 Names 8 pictures; (b) Detroit B — 6 correct; (c) Names one color.

Social Behavior. (a) P20 Puts on shoes; (b) P26 Puts toys away; (c) P36 Can be trusted with breakables; (d) P45 Advanced dramatic play; (e) P50 Asks questions of elders.

7. NORMATIVE SUMMARY FOR FORTY-TWO MONTHS LEVEL

Postural Behavior. (a) Walks on tiptoe.

Manual (Prehensory) Behavior. (a) M46 Traces diamond.

Perceptual Behavior. (a) A57 Matches 4 Binet forms; (b) A53 Discriminates lines.

Adaptive Behavior. (a) A43 Answers one comprehension question; (b) A70 Puts in "just two."

Language Behavior. (a) Detroit B — 8 correct; (b) L22 Obeys 4 preposition commission with cube; (c) A70 Puts in "just two."

Social Behavior. (a) P53 Tells sex; (b) P52 Knows a few rhymes.

8. NORMATIVE SUMMARY FOR FORTY-EIGHT MONTHS LEVEL

Postural Behavior. (a) Stands on one foot 4-8 seconds; (b) Walks 6 cm. board, touching ground only once to balance.

Manual (Prehensory) Behavior. (a) M43 Copies cross; (b) A25 Imitates gate; (c) P24 Buttons clothes; (d) P20 Laces shoes.

Perceptual Behavior. (a) A57 Matches 8 forms; (b) Draws man with head and legs; (c) A67 Adds 3 parts to incomplete man.

Adaptive Behavior. (a) A43 Answers two comprehension questions; (b) A25 Imitates gate, (c) A67 Adds 3 parts to incomplete man; (d) M43 Copies cross.

Language Behavior. (a) Detroit B — 11 correct; (b) L23 Obeys 4 prepositions (drawing), (c) L35 Tells what he has drawn.

Social Behavior. (a) P20 Laces shoes; (b) P24 Buttons clothes; (c) P25 Washes self, (d) P35 Goes on simple errands outside home.

9. NORMATIVE SUMMARY FOR FIFTY-FOUR MONTHS LEVEL

Postural Behavior. (a) Hops on one foot.

Manual (Prehensory) Behavior. (a) M46 Traces cross; (b) M43 Copies square.

Perceptual Behavior. (a) A54 Makes aesthetic comparison; (b) A25 Makes gate from model.

Adaptive Behavior. (a) A25 Makes gate from model; (b) M43 Copies square; (c) A71 Counts four objects.

Language Behavior. (a) L16 Defines by use; (b) A71 Counts four objects.

Social Behavior. (a) P55 Distinguishes between morning and afternoon.

10. NORMATIVE SUMMARY FOR SIXTY MONTHS LEVEL

Postural Behavior. (a) Walks 6 cm. board without stepping off; (b) Stands on one foot indefinitely.

Manual (Prehensory) Behavior. (a) M43 Copies triangle; (b) Pellets in bottle, 19 seconds.

Perceptual Behavior. (a) A26 Makes two steps of stairway; (b) A67 Adds ear and eye to incomplete man; (c) Identifies penny, nickle, and dime; (d) Draws man with feet.

Adaptive Behavior. (a) A72 Draws just one, two, three, and four bubbles correctly; (b) A71 Counts 10 objects correctly; (c) Both enumerates and describes Dutch scene; (d) Adds within five.

Language Behavior. (a) Detroit B — 14 correct; (b) L46 Articulation noninfantile.

Social Behavior. (a) P51 Distinguishes right and left; (b) Identifies penny, nickel, and dime; (c) P26 Puts toys away neatly in box; (d) P53 Tells age.

11. NORMATIVE SUMMARY FOR SIXTY-SIX MONTHS LEVEL

Postural Behavior. (a) Walks 4 cm. board without stepping off.

Manual (Prehensory) Behavior. (a) Can print a few letters.

Perceptual Behavior. (a) A26 Makes stairway from model.

Adaptive Behavior. (a) A26 Makes stairway from model; (b) Subtracts one (within five).

Language Behavior. (a) L36 Gives differences.

Social Behavior. (a) Knows what to do if house is on fire, (b) Can print a few letters.

APPENDIX F

GLOSSARY

THE definitions of the glossary include the terms and abbreviations used to designate the behavior items. The index may be used to refer to the definition of such terms as *focal item*, *critical age*, *behavior pattern*, and similar expressions.

Abbreviations. The following abbreviations are used throughout the text from time to time: B, bell; Ba, Ball play; Br, Bell ringing; CC, Consecutive cubes; CC1, First cube; CC2, Second cube; CC3, Third cube; CM, Massed cubes; Cp, Cup; Cp-Sp, Cup and spoon; Cp-C, Cup and cubes; C-S-B, Cup, shoe, box; Ct, Tower building; f, Feeding habits; F, Formboard; G, Give it to me; M, Mirror; P, Pellet; Pa-Cr, Paper and crayon; P-Bo, Pellet and bottle; per, Reported personal behavior; PfB, Performance box; pl, Play opportunities; Pr, Prone; Ra, Rattle; RD, Dangling ring; R-S, Ring and string; R-S-B, Ring, string, and bell; Si, Sitting; SiC, Sitting in chair; SiP, Pulled to sitting; so, Social behavior; Sp, Spoon, St, Standing; Stc, Staircase; Su, Supine; T, Table top; to, Toilet habits; v, Vocalization.

When the first letter of a symbol is *not capitalized*, the behavior is reported, rather than observed by normative examination

Acute flexed: flexed to an angle less than 90°.

Adducted (with reference to legs): a position close to the median plane of the body.

Adjusts (with reference to language items): indicates by regard or otherwise that the meaning of the communication has been understood or has served as a cue.

Alternately (with reference to attention shifts): prior to grasp, the attention shifts from one object to the other. It implies that both objects are not simultaneously spanned by the child's attention.

Apart (with reference to feet): separated four inches or more.

Approaches: any adjustive activity, initiated by the stimulus object, which brings the arms or hands nearer to the object.

Arches (with reference to the back): active dorsal flexion of the thoracic and lumbar spine.

Arm: one or both arms.

Assistance: balance or slight support is given the child.

Assumes: moves into position without assistance and retains the postural position although perhaps briefly.

Attains: succeeds in going from one position to another without help, unless the help is specified.

Attends: regards or directs activity toward.

Bobbingly erect: predominantly erect but unsteady, with fine rhythmic nodding, or gross lunging and re-erecting.

Bounces (with reference to hips): lying supine, repeatedly raises the hips while supporting the body on shoulders and feet.

- Bounces (with reference to ring): dangles ring by string and jerks string so that ring bobs up and down.
- (with reference to standing): repeated simultaneous flexion of the legs followed by vigorous extension so that the child repeatedly thrusts himself upward.
- Briefly (with reference to extension): position held more than momentarily but not prolongedly.
- Clenches (with reference to hands): if open, the hand closes tightly and prematurely so that the object is not grasped; if closed, the hand closes more tightly.
- Close (with reference to hands closing on each other): the hands approach each other rather than the object.
- Closed (with reference to hands): fingers flexed over the palm but not necessarily in contact with the palm.
- Combines: manipulates one or both objects so that they are brought into contact which is not merely fortuitous.
- Compensates (with reference to the head): resists the pull of gravity, holding the head either in line with the body or raised.
- Consistently (with reference to regard): the child does not necessarily regard the object continuously but his general activity indicates that he is aware of its presence.
- Contact: touches, with or without regard. A child may therefore contact an object without making an approach upon it.
- Crawling movements: leg movements as in crawls; arm movements are not necessarily present. The activity is usually ineffective in producing progression.
- Crawls: progresses while prone, the trunk resting in part or whole upon the supporting surface.
- Creeps: progresses forward with body raised from the supporting surface.
- Cruises: steps sideward while maintaining balance by any available support.
- Definitely fixates: regard is definitely arrested as the object comes into the line of vision.
- Delay: usually implies that there is some intervening activity such as obvious focus of attention on another object or other activity. It is not specified in terms of seconds but there is usually no difficulty in distinguishing between prompt activity and delayed activity.
- Depends (with reference to "depends on examiner or mother"): clings to mother or examiner, or adjustment is inadequate without presence of mother.
- Difficulty (with reference to pulled-to-sitting): does not come to sitting on the examiner's first pull. Instead, child may slide on the platform or may extend so that readjustment of the support is necessary.
- Directs approach: line of approach is regular but not necessarily direct.
- Dislodges: perceptibly moves the object from position.
- Drags: moves object along surface with or without grasping.
- Drops: involuntary or voluntary releasing of the object.
- Engage (with reference to hands and feet): Hands: one hand clasps or entwines finger or fingers of other hand. Feet: rubs together or crosses feet.
- Erect: vertical.
- Exploits: manipulates in an investigatory way; a diversity of behavior is implied.
- Extends back: active dorsal flexion of the spine.
- Extends head: active dorsal flexion at the neck so that the head is tilted back.
- Face arm: the arm toward which the face is directed when the head is turned to the side.

Face leg: the leg on the side toward which the face is turned when the head is turned toward the side.

Falls: any falling whether complete or intercepted by the examiner.

F.m. position: in the median line at the table edge, farthermost from the child, as designated on the diagram of the table top, Chapter IV.

Fingers (verb): moves object between fingers or, in case of table top, slowly moves fingers about in contact with the surface.

Fixates: arrest of regard on object.

Flexed: the angle between parts is less than 135°.

Foot: one or both feet.

Forward (head set forward): head is vertical but held slightly in front of, rather than in line with, the body.

— (with regard to progression): does not necessarily mean directly forward, may be forward and sideward.

Frankfort horizontal line: line passing through lowest point in margin of orbit and highest point in margin of auditory meatus.¹ (See Fig. 30.)

Free hand: hand which is not grasping the object.

Freely (with reference to head turning): turns smoothly and completely.

Frets: not necessarily crying but a vocalization incipient to crying. Actual crying is included.

Grasps: unless otherwise specified, the item implies approach to the object in the standard way, followed by closure of the hand on the object so that the object is actively held in the hand.

Gurgles: vocalizes a soft *g* sound by bubbling air through saliva over the posterior part of the tongue.

Hands together: hands in contact.

Head line: line perpendicular to the Frankfort horizontal (*q.v.*).

Holds: retains in grasp. The retention may be followed by subsequent release.

Immediate: within 3 seconds.

Immediately: as the object is placed in position.

Inadequate (with respect to balance): does not necessarily mean that the child falls but that the balance is precarious.

Incipient insertion (with reference to formboard): includes those cases where the block is definitely brought toward or placed near the hole.

Indefinite: questionable, poorly defined.

Induced (with reference to behavior): the behavior is modified in accordance with the demonstration.

Inserts: does not imply that insertion is complete, *i.e.*, that rod is completely put through the performance box hole.

Inserts (with reference to block): places the block in the hole; release is implied.

Inspects: regards with perceptible exploratory eye movements.

Interdigitally: between the fingers.

Intermittently (with reference to regard): repeated brief shifts of regard from the object prior to prehension.

Inverted (with respect to feet): the soles of the feet turned toward the midplane.

¹ Wilder, Marris H.: *A Laboratory of Anthropometry* Philadelphia: P Blakiston, 1920. P. 38.

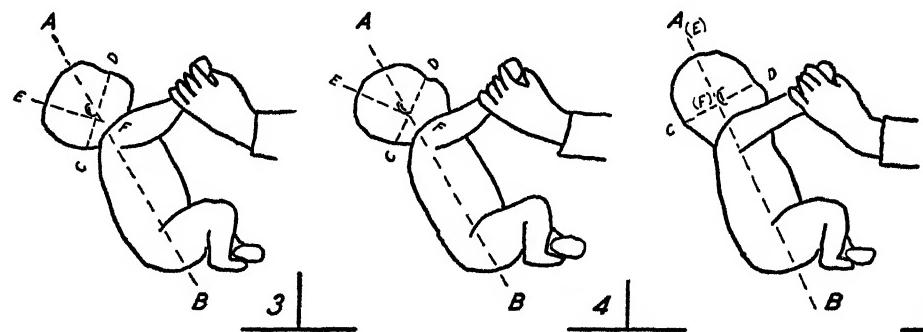
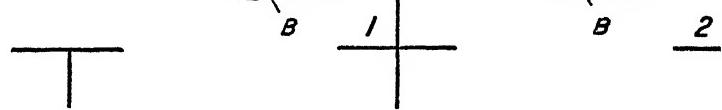
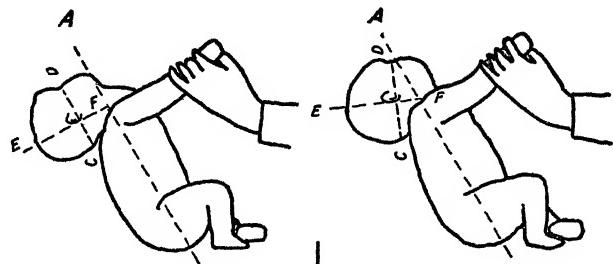
AB: LONG AXIS OF BODY

CD: FRANKFORT HORIZONTAL

EF: PERPENDICULAR TO CD

HEAD LAG:

ANGLE BETWEEN EF AND AB



FIVE DEGREES OF HEAD LAG OBSERVED
IN THE PULLED-TO-SITTING SITUATION. [SIP]

1. COMPLETE LAG, 90°
2. MARKED LAG, $45^\circ +$
- 3 MODERATE LAG, 45°
- 4 SLIGHT LAG, $45^\circ -$
5. NO LAG, 0°

FIGURE 29

- Inverts (with reference to hand): turns palm of hand toward the midplane.
- Kicks: refers to one or both legs. At the early age levels the motion is one of flexion and extension or extension of the already flexed limbs.
- Knows breast or bottle: indicates by increased animation or activity or by anticipatory mouth movements or reaching on sight of breast or bottle.
- Lags (with reference to head): as the child is pulled from supine to sitting, the head lags in passive dorsal flexion behind the frontal plane of the body.
- markedly (with reference to head): see Fig. 29.
- moderately (with reference to head): see Fig. 29.
- Laterally (with reference to arms): extended sideward at right angles to the body.
- Leg: one or both legs.
- Line of vision: a position in the plane of regard at a favorable distance (about 1 foot) which demands slight convergence of the child's eyes.
- Long heads: those infants in whom the perpendicular distance from the line of the ears to the occiput is large in proportion to the diameter of the head at the otobasion superius.²
- Lowers (with reference to self): refers to attaining, with control, the sitting position from the standing position.
- Maintains: not necessarily prolonged behavior but sustained more than momentarily.
- Manipulates: hand activity with object including scratching, fingering, slapping, rubbing, and patting. See item notes for more specific reference.
- Median position (with reference to table top): either along the median line or with the center of the object on the median line.
- Midplane: the sagittal plane or the dorsal-ventral plane passing through the center of the body.
- Midposition (with reference to head): the midplane of the head is coincident with the midplane of the body.
- Momentary: less than 3 seconds. It should be noted that this duration of regard is comparable with transient regard specified by Castner.³
- N.m. position (with reference to table top): on the median plane, midway between the standard position and the table edge, Chapter IV.
- Occiput arm: the arm toward which the occiput is directed when the head is turned toward the side.
- Occiput leg: the leg on the side toward which the occiput is directed when the head is turned toward the side.
- Open (with reference to hands): not closed; the fingers may be slightly flexed but unless they are flexed over the palm, the hand is said to be open.
- Opposition (with reference to thumb): by circumduction the volar pad of the thumb is brought into an oppositional relationship to the volar pad of another digit, with or without an intervening object.
- Outwardly (with reference to outward rotation of legs): the medial aspects are turned ventrally.
- Passively: without any differential overt response like mouthing, straining, or any kind of apparent approach.

² Martin, Rudolf: *Lehrbuch der Anthropologie* Jena: Gustav Fisher, 1928. Vol. 1, pp. 148. The superior point where the ear attaches to the side of the head.

³ Castner, B. M.: "The Development of Fine Prehension in Infancy." *Genetic Psychology Monographs*, 1932, 12, 2, 156-157

Perceptibly (with reference to head turning): noticeably or more than about 15°.

Pivots (with reference to dorsal): the child retains the supine position but so maneuvers that the long axis of the body makes an angle to its original position. The pivotal point may be the trunk or the head.

— (with reference to sitting): By rotation the child so changes his orientation that when he sits erect, not turning to either side, he faces in a new direction.

Places (with reference to cube on cube, spoon in cup, cubes in cup, bell in ring, or ring over bell): does not necessarily imply that the object is then or subsequently released.

Pleasantly (with reference to "responds pleasantly to situation"): the child gives some evidence of enjoyment in the situation. He may smile, laugh, or otherwise display eagerness by postural activity.

Plucks: prehends with pincerlike prehension preceded by overhand approach.

Pokes: usually applies to the index finger but occasionally the thumb is also used for poking. The other fingers may or may not be extended.

Postural activity (with reference to bell ringing): any activity of head, arms or body.

— (with reference to other situations): any change of position such as pivoting, pulling to standing, or creeping. Such items as bouncing or any other gross bodily movements are also included.

Predominantly: more than half the time.

Presenting hand of examiner: hand with which examination material is presented.

Prominently: more than perceptibly, but not quite predominantly.

Pursues (with reference to visual pursuit): does not necessarily mean continuous visual pursuit, but subsequent regard which occurs with sufficient promptness or with sufficient directness so that it is obvious that the object has either been followed to its position or that the child is definitely searching for the moved object.

Quadrupedal (with reference to the prone position): the child rests on hands and both feet or hands, one foot and one knee.

Rail, side: top of the side panel of the crib.

Recurrently (with reference to regard): the child regards the object, looks away, and again regards the object in a fairly brief period. It includes intermittent regard.

Regards: any visual fixation on the object. Doubtful instances are included.

Releases: a movement of the hand, apparently voluntary, which detaches the object from grasp. It is not always possible to distinguish releasing from other types of dropping, but at the incipient stages the more voluntary release is usually accompanied by regard for the object while mere dropping is not.

Removes cube from cup or block from formboard: does not include lifting the cup and shaking it so that the cube dropped out, or lifting the formboard so that the block remains on the table. It refers instead to grasping the cube or block and lifting it from the cup or hole.

Re-secures: re-grasps.

Responds (with reference to faces, to "bye-bye," to inhibitory words, to "so big," to ball play): any reaction, whether complete, imperfect, or partial, which is clearly responsive to the word or the total situation.

Rolls (ball): any releasing of the ball so that it rolls.

— (pelvis): rotates pelvis.

— (to side): the pelvis may not be as completely turned as the shoulders; or the shoulders may not be as completely turned as the pelvis; but the child has not rolled fully to a reverse position and is not in prone or supine position.

Rotated (with reference to the turning of the head): the sagittal plane of the head is turned to make an angle of 45° or more to the sagittal plane of the trunk.

Rotates (with reference to cubes and cup): turns the object about. The rotation may take place as it is held in the hand without transfer, or the object may be transferred from one hand to the other and thereby rotated.

Round heads: those infants in whom the perpendicular distance from the line of the ears to the occiput is small in proportion to the diameter of the head at the otobasion superius. (See *long head*.)

S.m. position: standard median position as designated on the diagram of the table top, Chapter IV.

Sags: the head droops in passive ventral flexion.

Says (with reference to words): the word is not necessarily comprehensible but the sound is repeatedly and consistently made with a particular meaning.

Semi-extended: extended so that the angle at the joint of flexion is between 135° and 180°.

Set forward: see *forward*.

Shifts (with reference to regard): any definite transfer of ocular fixation which occurs after the object is regarded and before it is dropped. If the record states that the child regards the cube, then his own hand, then surroundings, his regard would be said to shift to both his own hand and the surroundings.

Sideward: toward the side.

Slightly (with reference to head lag): see illustration, page 272.

Slumps (with reference to the body position): relaxation is not necessarily implied. If, for instance, when the child is in the chair and supported only by the canvas band, he gradually leans more and more to the side and does not independently resume the erect position, he is said to slump to the left.

Smiles: the usual changes in contour of mouth and eye slits.

Sober: an unsmiling expression.

Spontaneously (with reference to rattle): the rattle is regarded in the midplane (this may be the line of vision) before it is moved to the line of vision or before it is shaken.

Staccato marks (with reference to paper and crayon): mere dots or dots with a faint line, as opposed to a more uniform, smooth, and continuous line.

Stands on toes: the heels are raised while the foot remains in partial contact with the platform. Weight is not necessarily supported.

Stares: a diffuse fixation in line with but beyond the object, accompanied often by reduction of activity and widening of eye slits.

Starts (with reference to bell ringing): varies from sudden jerky movements to a complete Moro reflex response and is usually followed by a very brief cessation or reduction of activity, or sometimes by crying.

Steady (with reference to the head): erect position is maintained without nod or wobble.

Stepping movements: alternate flexion and extension of first one leg and then the other when the child is held in the standing position. The feet may return each time to their original position (in which case the child steps in place) or they may advance on the platform with

- each step, in which case he will progress if the examiner keeps the trunk in line with the legs. Full weight is not, of course, supported by the child.
- Strains toward: leaning evidenced by ventral flexion of the neck and possibly of the thoracic spine.
- Support, slight (with reference to sitting position): by light pressure exerted either on the side or back of the child's trunk, the examiner provides very slight assistance toward maintenance of balance.
- Surmounts (with reference to staircase): both feet are brought up to the tread designated.
- Surroundings: a general term which applies to all of the environment with the exception of persons, the table top, crib, or the immediate test materials.
- Sustainedly (with reference to head in the prone position): the head is held in position more than momentarily. It often happens that a child who has held the head sustainedly for a brief period, presently holds it only momentarily.
- Swings (with reference to pelvis): by lateral flexion of the spine, the pelvis is moved sideward.
- Throaty noises: soft subvocal sounds produced by the back of the tongue and throat.
- Tonic-neck-reflex position: a postural attitude in which the head is held sustainedly rotated to the side, with the arms and frequently also the legs in asymmetric position. Typically the face arm (the arm toward which the face is turned) is extended and free to move, while the homolateral leg may be flexed; the opposite arm is sharply and tonically flexed near the occiput, and the homolateral leg is in relative extension.
- Transfers: when the child is holding an object in one hand and takes hold of it with the other hand, releasing it with the first hand, the object is said to be transferred from one hand to the other.
- Transposes (with reference to objects, especially cubes): the child grasps the cube and places it elsewhere.
- Turns cup over (with reference to inverted cup): cup is rotated so that it rests either on its side or right side up.
- Turns head: rotates head.
- Turns to side (with reference to sitting): rotates shoulders and upper trunk.
- Turns to side rail: pivots facing the side rail or merely turns to side and directs attention to side rail.
- Twiddles (with reference to cube): rotates cube slightly by moving it between thumb and fingers.
- Undirected (with reference to hand-arm activity): the movements differ from those seen before the object is regarded, but do not result in bringing the hand nearer the object.
- Uniformly rounded (with reference to the back): the cervical, thoracic, and lumbar spine are flexed ventrally in a smooth continuous line.
- Ventral suspension: as the child is being lowered to the prone position, the position is indicated as one of ventral suspension, although the child is not retained in the position.
- Vocalizes: is a general term referring to any audible, undifferentiated vocal activity.
- Windmill motions (with reference to the arms): the arm moves headward rapidly and is then brought down over the face and chest tensely and tremulously and more slowly; the movements usually occur in series and may involve one or both arms.
- Withdrawing hand (with reference to the examiner's hand): the examiner's hand from the time it leaves the object in position on the table top until it is out of sight.

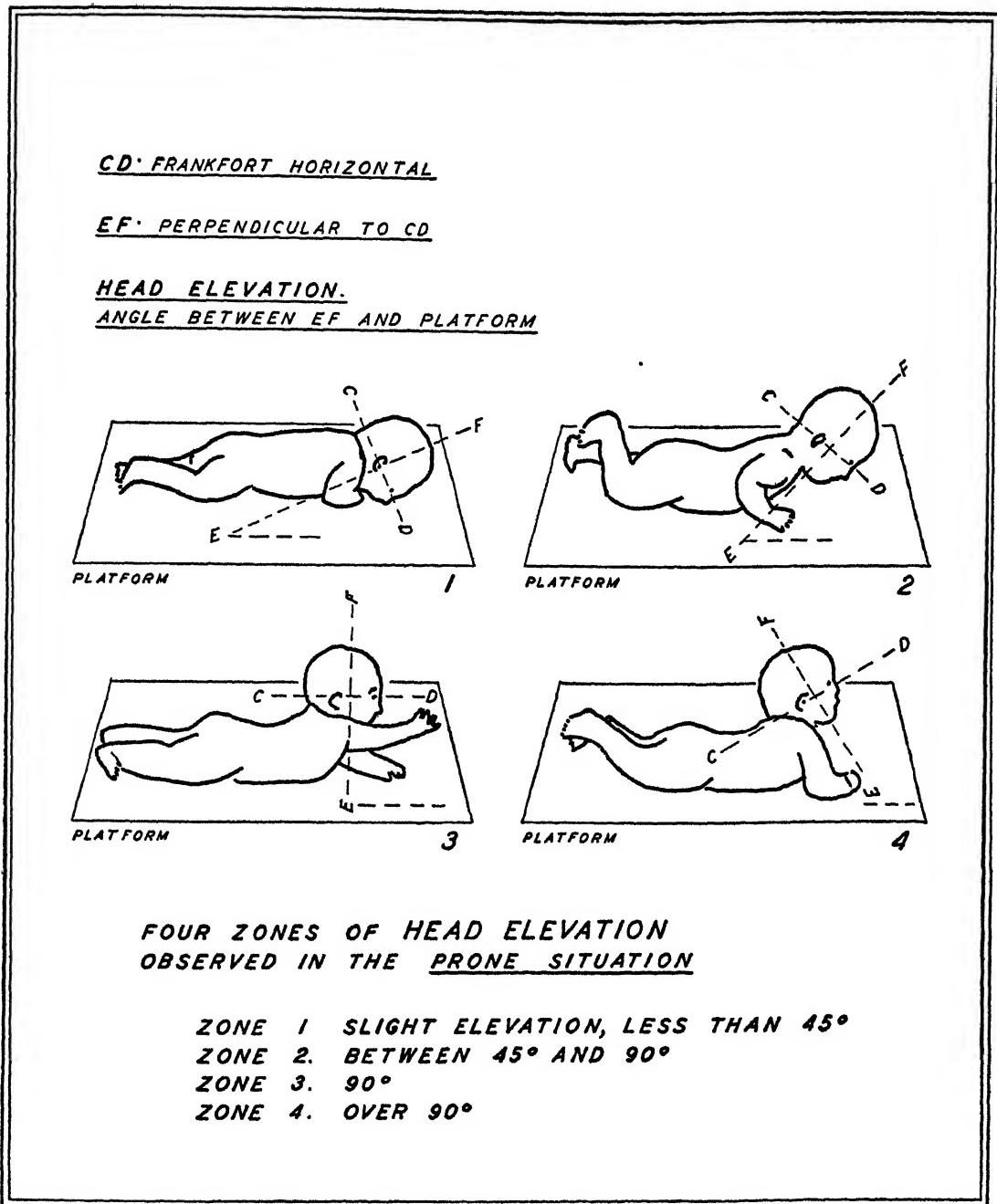


FIGURE 30

Withdraws from strangers: will not go to strangers after a brief introductory interval between 5 and 10 minutes.

Zone 1 (with reference to head elevation in the prone situation): the line of the head EF (namely the perpendicular to the Frankfort horizontal CD) makes an angle of less than 45° with the platform. (See Fig. 30.)

Zone 2 (with reference to head elevation in the prone situation): the line of the head EF (namely the perpendicular to the Frankfort horizontal CD) makes an angle between 45° and 90° with the platform, AB. (See Fig. 30.)

Zone 3 (with reference to head elevation in the prone situation): the line of the head EF makes an angle of 90° with the platform. The Frankfort horizontal is parallel with the platform. (See Fig. 30.)

Zone 4 (with reference to head elevation in the prone situation): the head is retracted so that EF makes an angle with the platform greater than 90°. (See Fig. 30.)

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